



KRAMER CONSULTING, LLC

Engineers • Planners • Surveyors

PRELIMINARY ENGINEERING REPORT

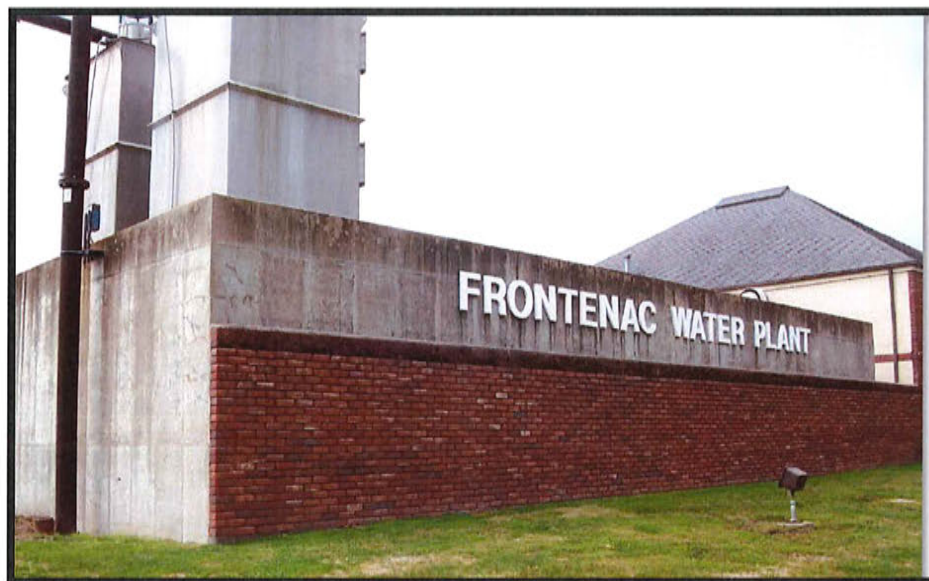
Water Supply, Treatment, Distribution and Storage

Improvements and Additions

for

City of Frontenac, Kansas

PRELIMINARY ENGINEERING REPORT



Water Supply, Treatment, Distribution and Storage Improvements and Additions

OWNER:

City of Frontenac, Kansas

ENGINEERS:



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July 2018



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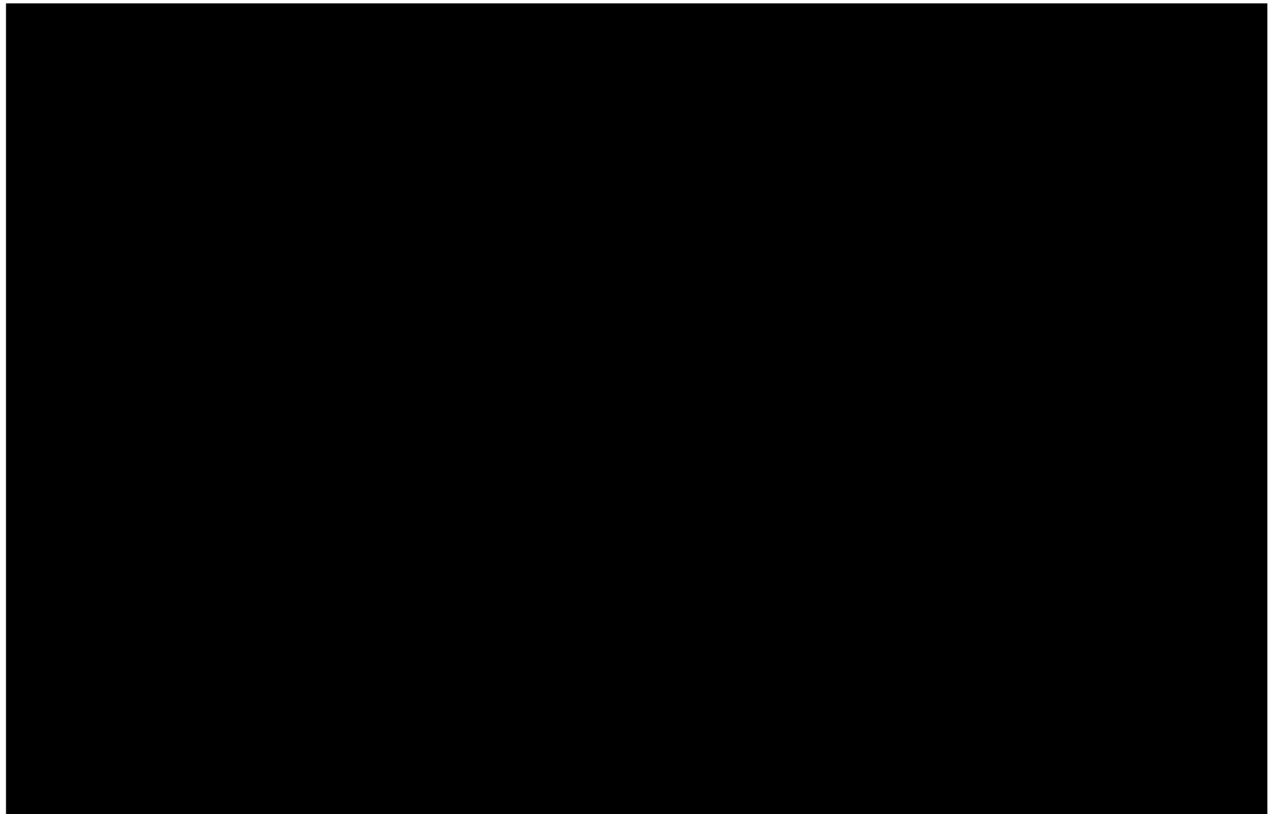
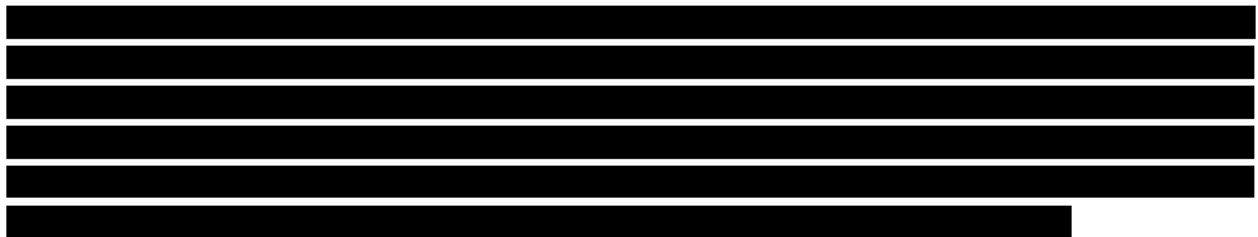


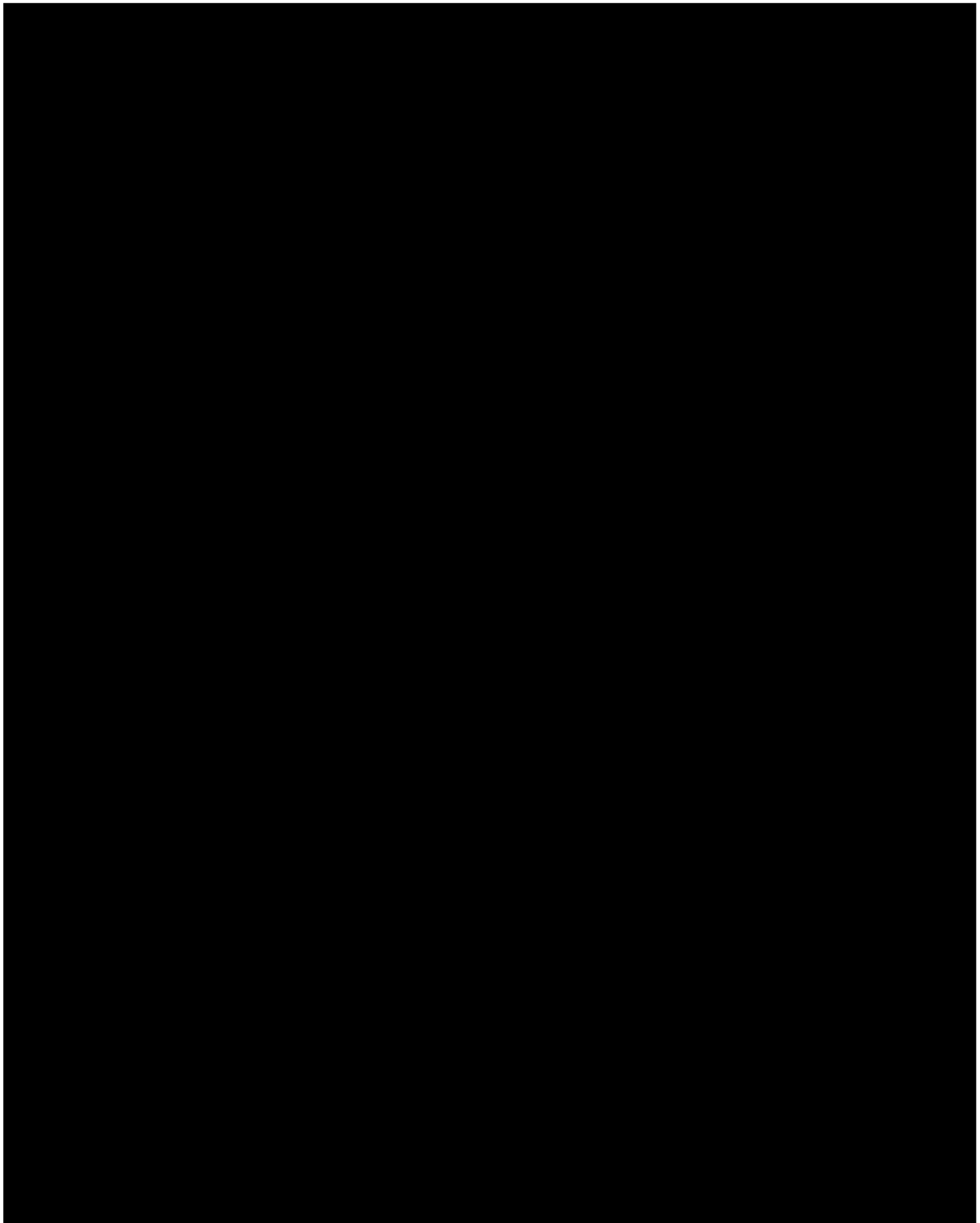
SECTION 1

PLANNING AREA

1.1 LOCATION

Frontenac is located in southeast Crawford County, Kansas, approximately 32 miles north of the Kansas-Oklahoma border and 4 miles west of the Kansas-Missouri border along U.S. Highway 69. Frontenac is a typical small Kansas community with a population of 3,450 persons and covers approximately 5 square miles. The City owns and operates its own water supply, treatment facilities, distribution and storage.







1.2 ENVIRONMENTAL RESOURCES

The area surrounding Frontenac has ranching and agriculture. There are two large industries and ten smaller businesses located in the industrial park in the western part of the City. Several other businesses and stores are located in Frontenac. Also, due to the close proximity to Pittsburg State University there are several national technical training centers, such as John Deere and Harley Davidson located in Frontenac. Unified School District No. 249 maintains K-12 schools within the City.

There are no known historic sites, endangered species or critical habitats in the planning area that were identified in the City's Intergovernmental Review done in October of 2006. The review was completed for a water supply, water storage and water distribution system improvement project. Intergovernmental Reviews were re-submitted to appropriate agencies and tribal lands for a water supply, storage and treatment improvements project, and a report was completed in February of 2017. There were no significant concerns during either of these reviews. Water projects described in these Intergovernmental Reviews have been delayed until now. New environmental reviews will be done for the proposed project herein.

Water improvements will not have a major effect on land uses. The project will improve water supply, quality, storage and treatment for the entire City and insure adequate safe water for current population and future growth in the planning area. Project improvements will have continuing compatibility with the community needs over the planning period.

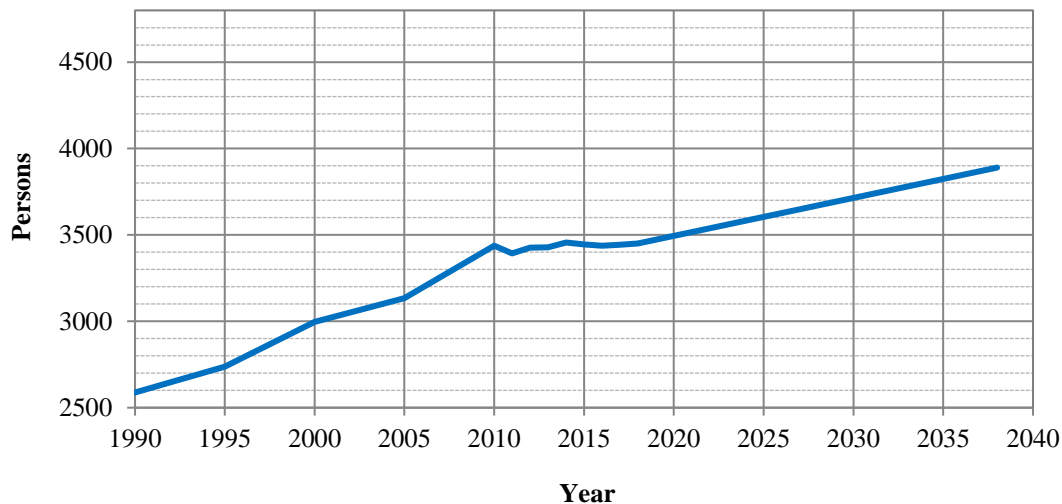
1.3 POPULATION

The future population to be served and future development are affected by many indeterminate factors that the prediction of future growth, regardless of the degree of prior study, should be considered as only an approximation. A detailed analysis of population trends from Frontenac and reasons for population change is beyond the need and scope of this study. Data from sources including the U. S. Census records, City Data and Kansas Demographics by Cubit were used to show past population trends and projected population for Frontenac.

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Graph I - 1
Population Trend in Frontenac



Year Population

1990 ^[1]	2588
1995	2738
2000 ^[1]	2996
2005	3134
2010 ^[1]	3437
2011	3394
2012	3427
2013	3428
2014	3456
2015	3445
2016	3438
2017	3444
2018	3450
2038	3890

^[1]Population based on US Census

Past population data indicates that Frontenac's population is gradually increasing. For making future water use projections, it is recommended that the population be considered increasing as shown above. Therefore, it is recommended that a design population of 3,890 persons be selected for the design year 2038. This population will allow facilities to serve the present population and provide reasonable growth margin, yet not unduly increase the cost of the project and financial burden on current consumers. Although population and design year is based on a 20 year projection, the useful life of facilities generally exceed 40 years without major replacement.

1.4 **COMMUNITY ENGAGEMENT**

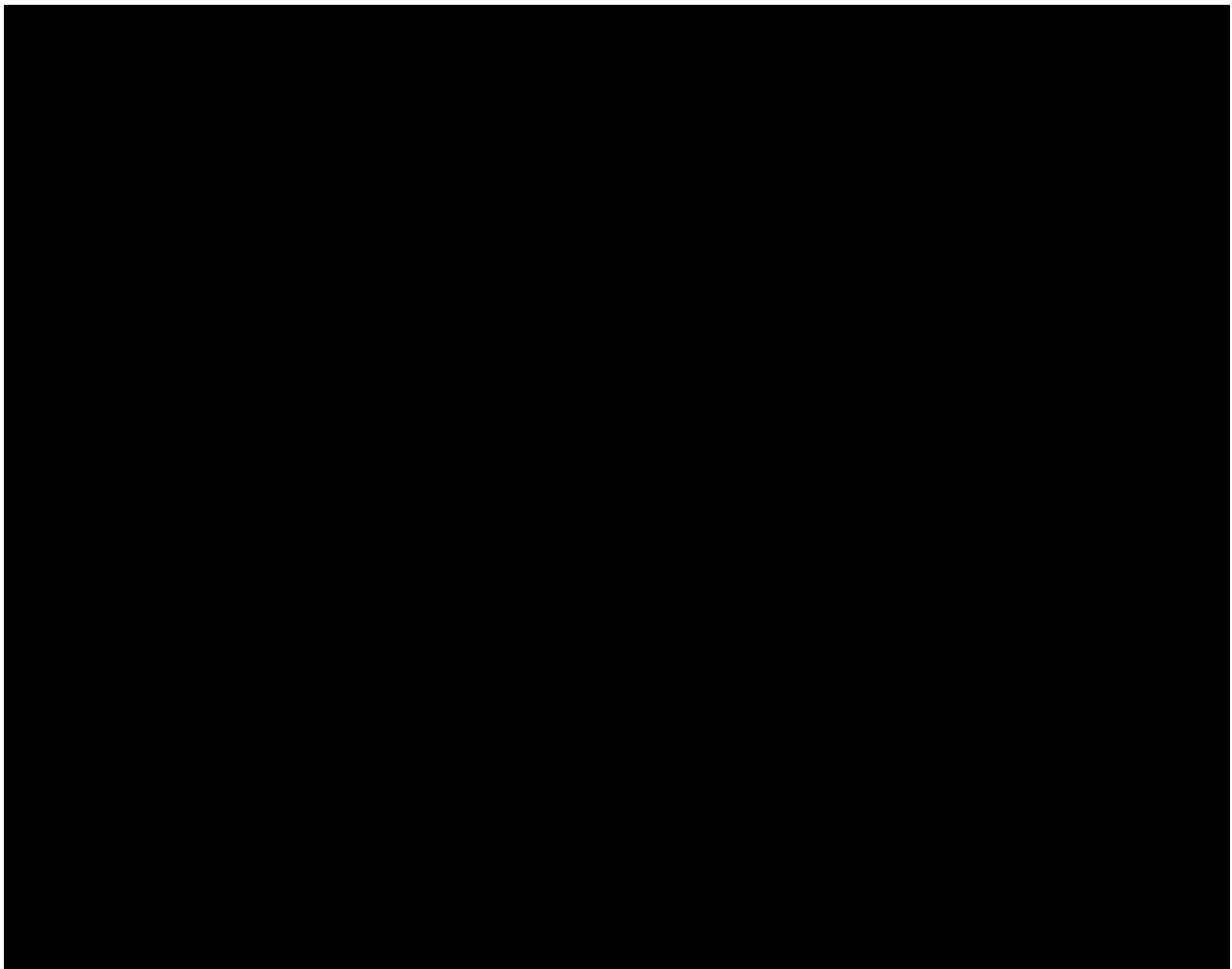
Water supply and water storage improvements have been discussed at several City council meetings. A public hearing was held to inform the public about water improvements to the water plant and water storage. This hearing was held on December 4, 2006. A subsequent hearing was held on October 3, 2016 to discuss water supply, storage and treatment improvements, with no objections to the project. Additional public hearings are planned to inform the citizens on the proposed water improvements covered in this report and as required to meet funding agency requirements.

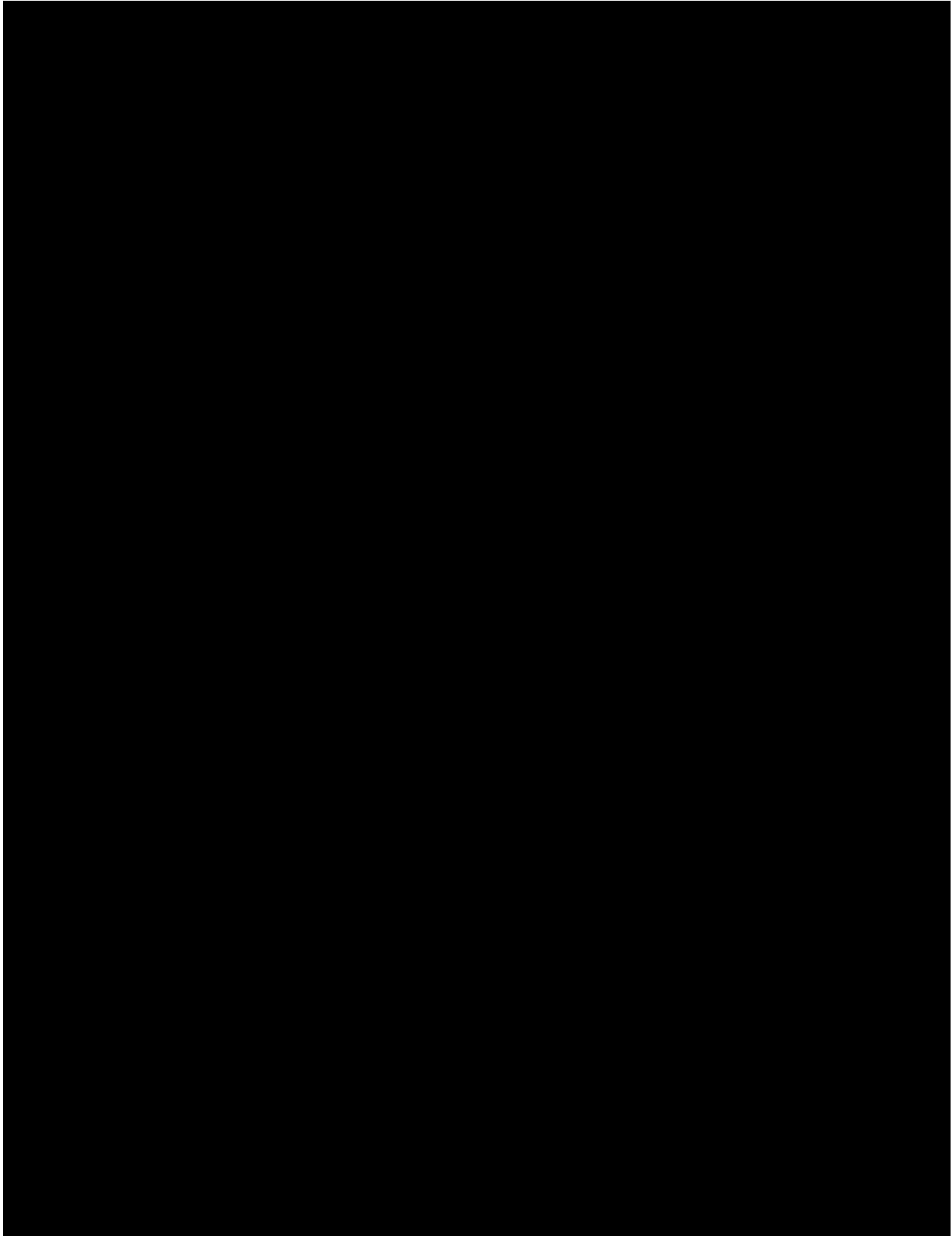
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SECTION 2

EXISTING FACILITIES







2.2 HISTORY

2.2.A Water Supply

2.2.A.1 Wells

The current water supply for the City of Frontenac includes three (3) public water supply wells. Wells are traditionally characterized by relatively low operational costs, low maintenance demands and typically constant water quality.

Current water supply for the City of Frontenac consists of three deep wells. Original Well No. 1 (north well) and Well No. 2 (south well) were constructed in 1902 and 1906 respectively. In 1990, the well numbers were changed by the plant operator, so the original Well No. 1 is now No. 2 (north well) and original Well No. 2 is now Well No. 1 (south well). [REDACTED]

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City records indicate that all three (3) wells have flow switches on their respective discharge lines at the well. These flow switches send a signal to the main control panel at the water plant verifying the pump is pumping water and also turns the plant equipment on. If the flow switch is not activated within a 15-30 second period, the control panel turns the respective well pump off.

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Table II – 3
Classification of Hardness
Total Hardness as

<i>Classification</i>	<i>CaCO₃ (mg/L)</i>
Soft	0 to 75
Moderate	76 to 150
Hard	151 to 300
Very Hard	Above 300

Hard water is alkaline water which contains dissolved salts which interfere with some types of industrial processes, prevents soap from sudsing, and builds up on home appliances. Typically, calcium and magnesium concentrations cause these issues. Soft water is considered any water that does not contain a significant amount of dissolved minerals, such as salts of calcium or magnesium. Water systems can have too much water hardness, but inadvertently have too soft of water where it may be difficult to rinse soap suds off, become corrosive to piping or have no taste. By providing a softening treatment technology, not only will the hardness of the water be reduced, but other contaminants, such as combined radium, will be reduced.

The current water treatment plant removes hydrogen sulfide and provides filtration and disinfection but does not provide treatment for combined radium removal or water softening. It also does not provide for hydrogen sulfide gas odor removal. Softening is generally a technique used for reducing or removing combined radium.

The City is required by EPA, and enforced by KDHE, to meet the National Primary Drinking Water Regulations, which sets limits on legally enforceable primary standards and treatment techniques that apply to public water systems in order to protect public health by limiting the levels of contaminants in drinking water by setting Maximum Contaminant Levels (MCL) for each contaminant.

A copy of the additional KDHE testing results can be found in Appendix C. These tests were performed on the raw water and the treated water. A review of the most recent treatment plant water test shows the plant producing water which complies with KDHE standards.

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Table II - 4 - Typical Chemical Analysis of Frontenacs's Well Water		
Contaminants	Concentrations	
	Well No. 1	Well No. 3
Alkalinity, Total	273 mg/L	265 mg/L
Aluminum	ND	ND
Arsenic	ND	ND
Barium	200 µg/L	274 µg/L
Calcium	69.8 mg/L	79.3 mg/L
Chloride	230 mg/L	303 mg/L
Conductivity @ 25° C µmhos/cm	1270 µmhos/cm	1510 µmhos/cm
Fluoride	0.52 mg/L	0.46 mg/L
Hydrogen Sulfide (un-ionized)	1.6 mg/L	1.3 mg/L
Total Hardness (as CaCO ₃)	302 mg/L	344 mg/L
Iron	65 µg/L	533 µg/L
Langelier Index	-0.03	0.12
Magnesium	31.0 mg/L	35.4 mg/L
Manganese	9.5 µg/L	8.7 µg/L
Nitrate	ND	ND
Nitrite	ND	ND
pH	7.21 pH	7.33 pH
Temperature	23.1 °C	23.0 °C
Phosphorus, Total	ND	ND
Potassium	6.52 mg/L	6.88 mg/L
Selenium	ND	ND
Silica	10.6 mg/L	10.7 mg/L
Sodium	147 mg/L	170 mg/L
Specific Conductance	1250 umhos/cm	1390 umhos/cm
Sulfate	34.9 mg/L	35.8 mg/L
Sulfide	4.6 mg/L	4.4 mg/L
TDS	554 mg/L	672 mg/L
Gross Alpha	8.81 pCi/L	pCi/L
Zinc	ND	ND

The above table represents raw water from the two existing wells from samples taken on May 4, 2018.



2.2.B Water Treatment Plant

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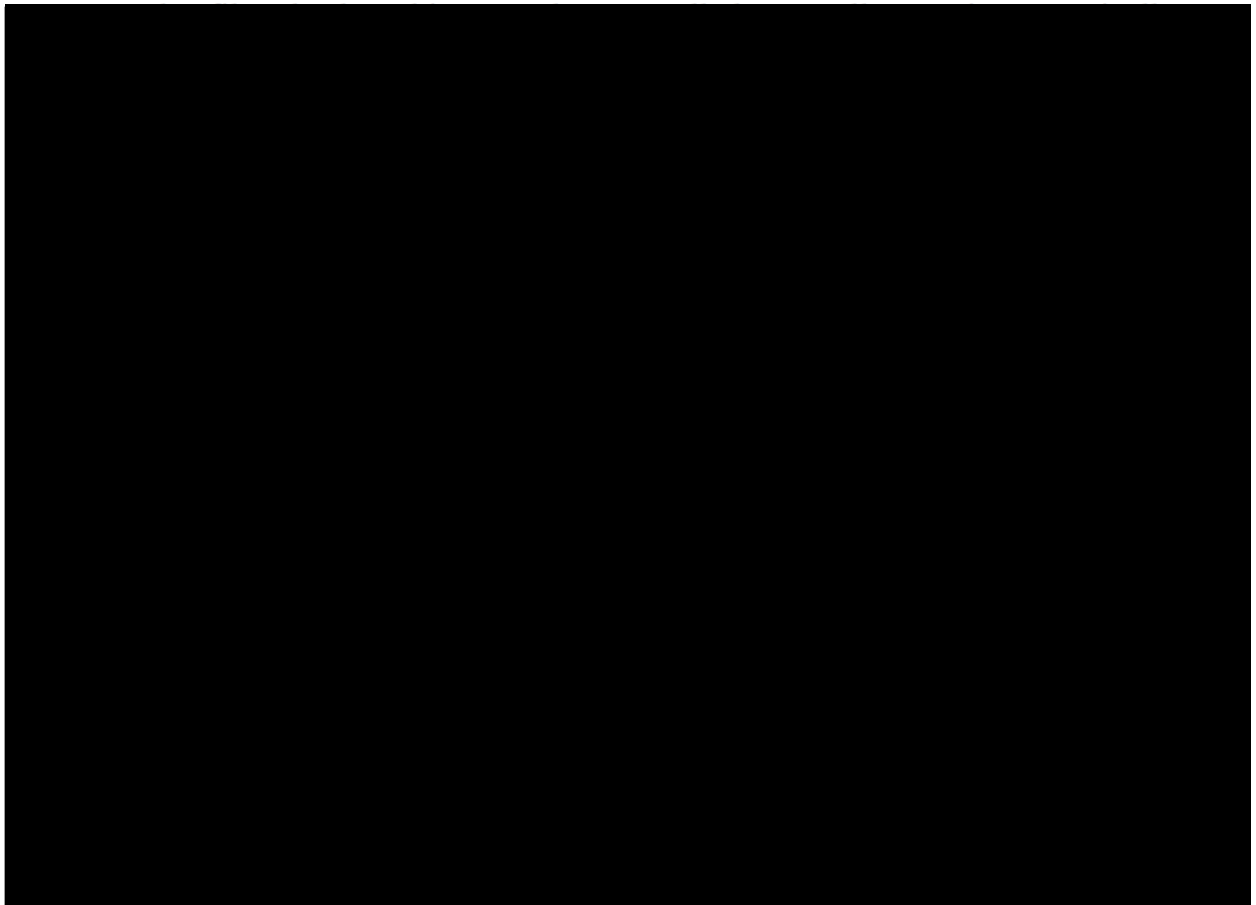
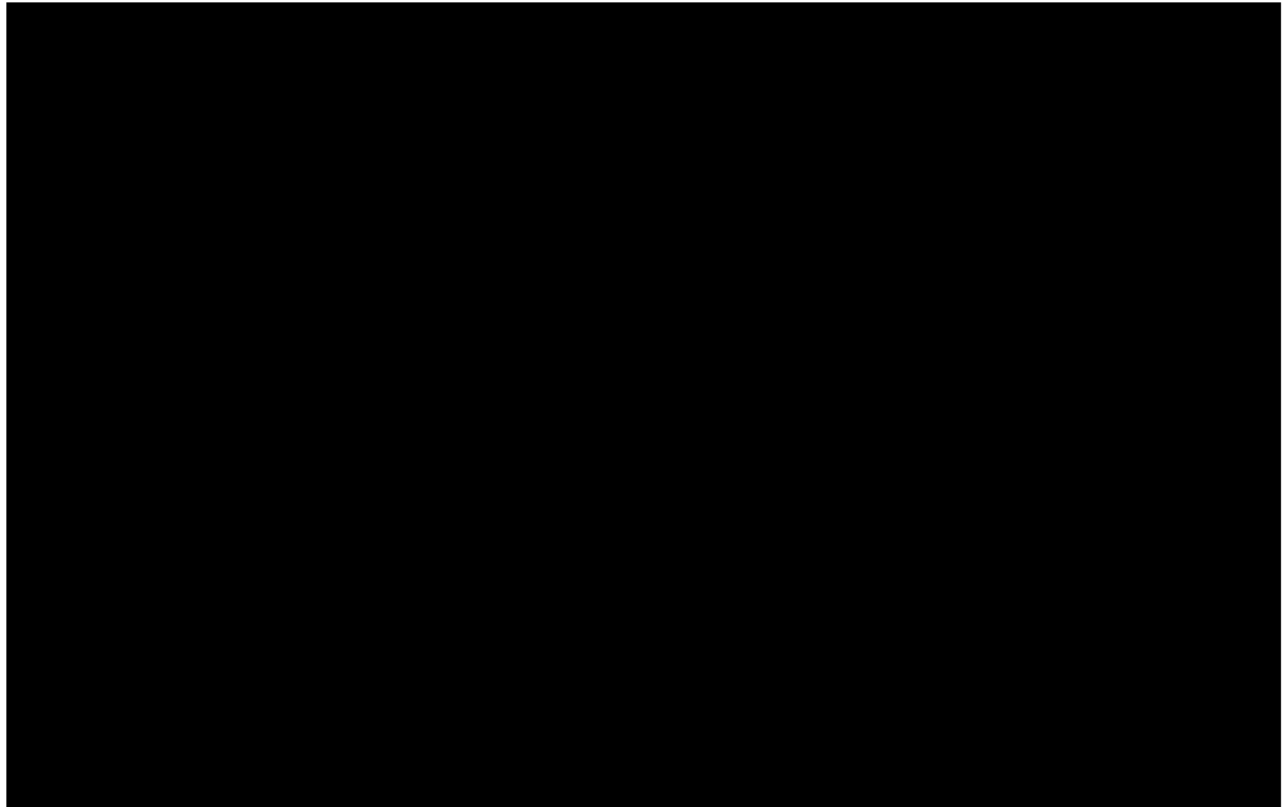
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2.2.C Water Distribution System

The existing water distribution system serving the City is constructed of cast iron, asbestos cement, and PVC plastic pipe, which varies in size from ¾-inch to 8-inch and with gate valves for isolating areas of the system. The system has been in operation since early 1900's with several extensions and many line replacements. Water services are metered (1,481 existing meters) and fire hydrants are provided on the distribution system.

A water system improvement project was constructed in 2010 to replace failing asbestos cement pipe. There was 11,500 feet of 8" PVC plastic pipe installed with valves, fire hydrants and new services.

2.2.D Water Storage

Water storage is provided by a 160,000 gallon in ground concrete clearwell at the water treatment plant, a 75,000 gallon elevated water storage tank located at the plant site and a 250,000 gallon elevated water storage tank located on the west side of the City in the Industrial Park. The concrete clearwell was constructed in 1991 as part of the water treatment plant construction. The 75,000 gallon elevated water storage tank was constructed in 1907 and the 250,000 gallon elevated water storage tank in 1980.

The interior of the 250,000 gallon elevated water storage tank was sandblasted, spot repaired and painted in 2008.

2.3 CONDITION OF EXISTING FACILITIES

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2.3.B Water Plant

The water treatment plant has a maximum design rate of 1,050 gpm, presently operated around 700 gpm. The plant building is in good condition, well maintained and kept cleaned and repainted as necessary. However, due to age and unreliable service, the following treatment plant equipment needs to be replaced:

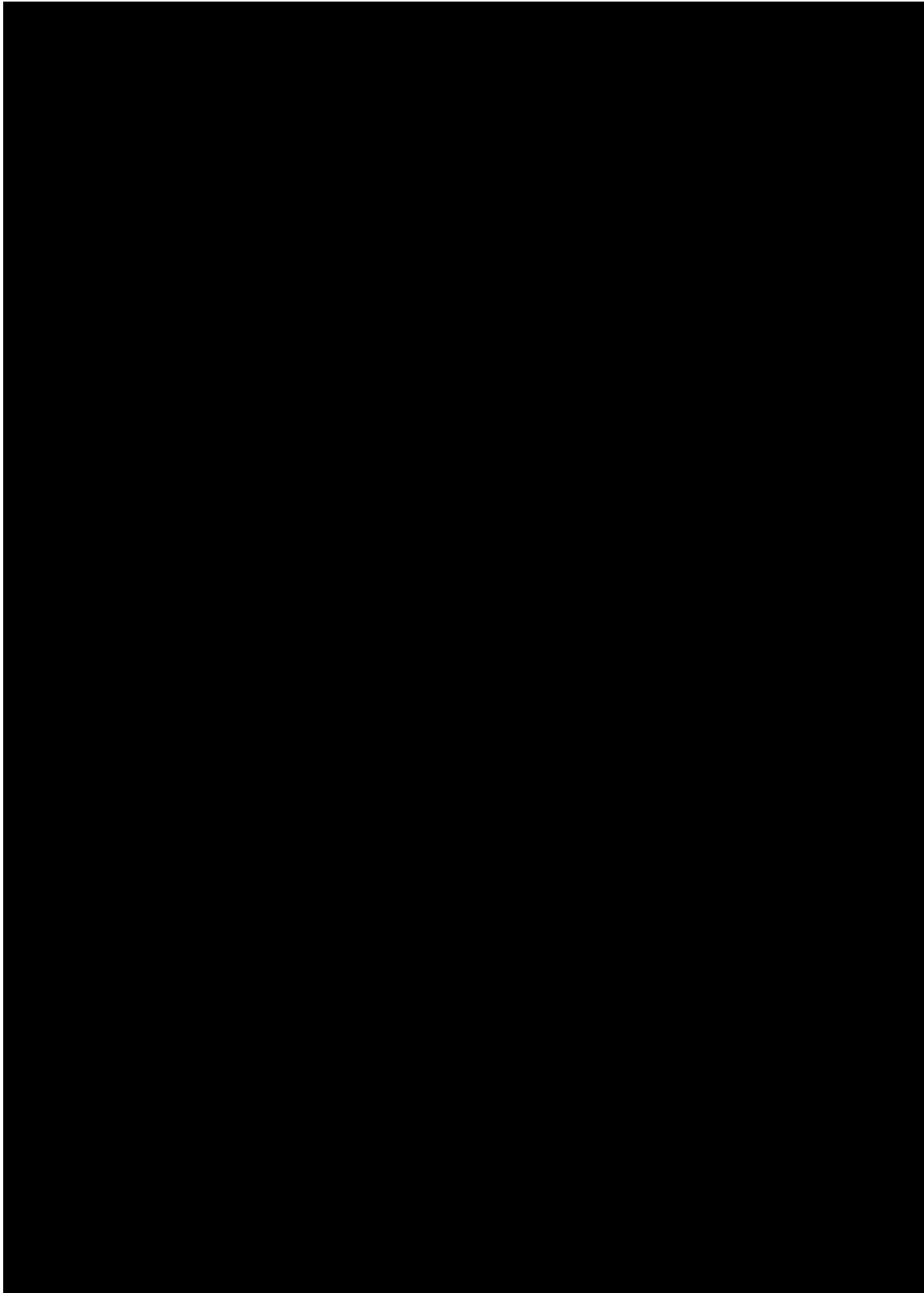
- Tower level controls
- Filter control console
- Plant control panel
- Filter water distributor
- Filter media
- Chlorine feed system
- Backwash wastewater pumps
- Piping in chlorine room
- Plant water meters

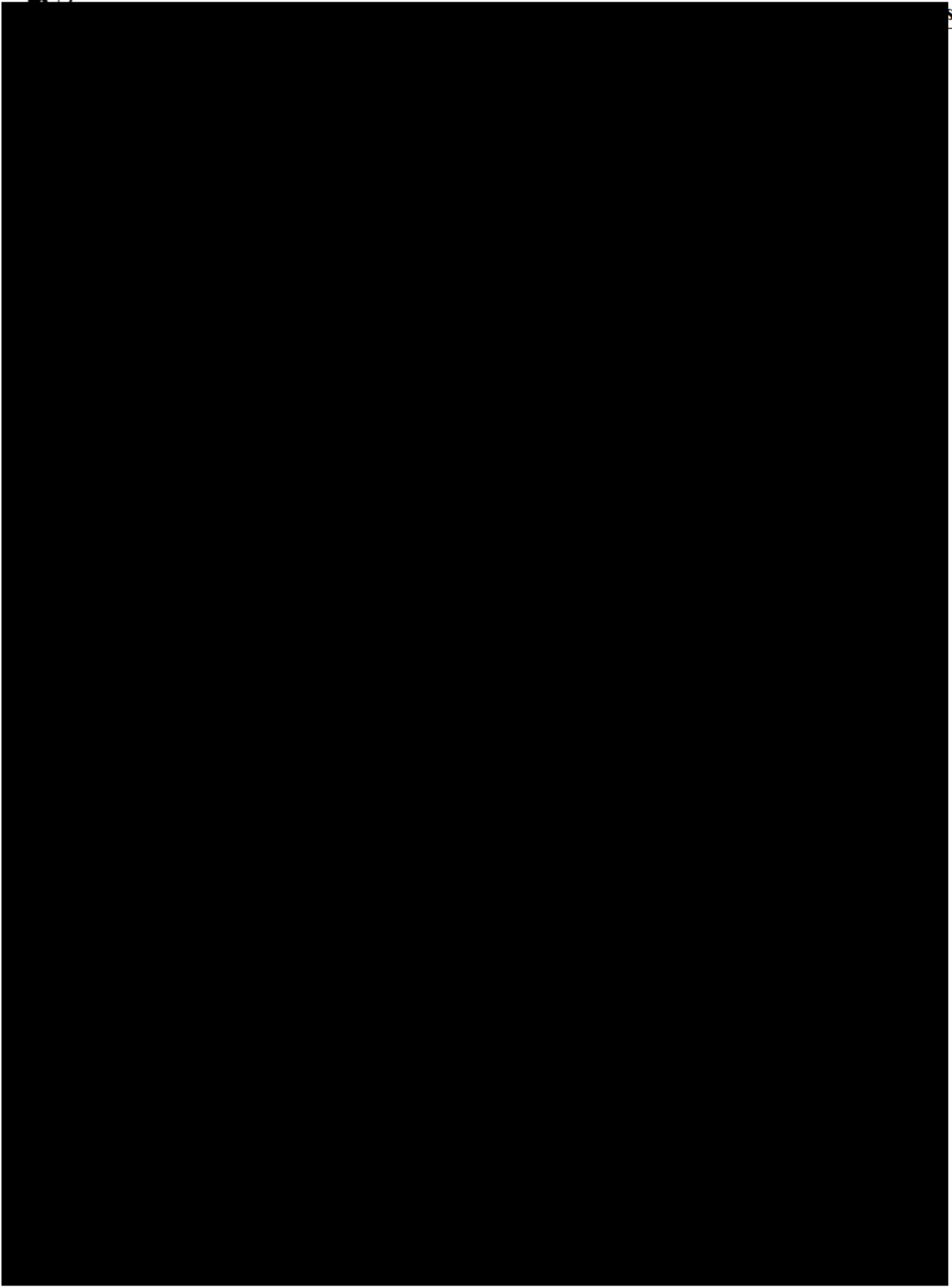
Other plant items that need to be upgraded are as follows:

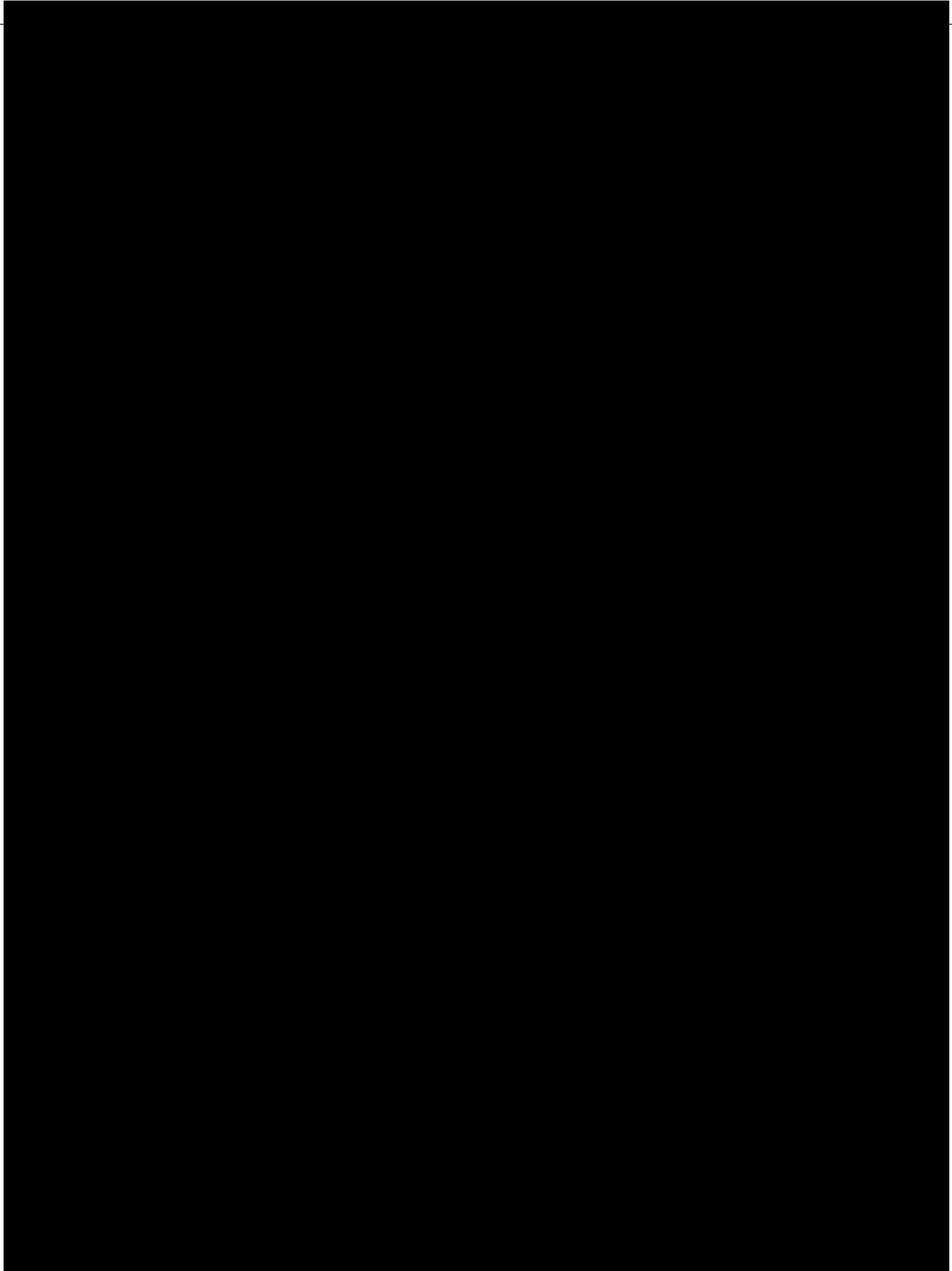
- Rehabilitate the existing 75,000 gallon elevated water storage tank
- Install new tower level controls at Industrial Park water tower
- Install plant remote monitoring for better plant operation and control
- Install plant alarm monitoring for better plant security and emergencies
- Modify high service pumps with VFD drives
- Install odor control scrubber unit for Hydrogen Sulfide gas removal
- Install water softening technique to reduce total hardness and combined radium

With new equipment and plant upgrades shown herein the water treatment plant has the capacity and is suitable to serve the planning area through the design year 2038, based on current EPA and KDHE water regulations.

Water treatment plant photographs are located on the following page.









2.3.C Water Distribution System

Areas within the water distribution system are in need of major repair. The majority of the pipe that needs to be replaced is cast iron pipe (CIP) and ductile iron pipe (DIP). The City's water utility department staff has had numerous breaks and line failures recently, along with many valves that are no longer operational.

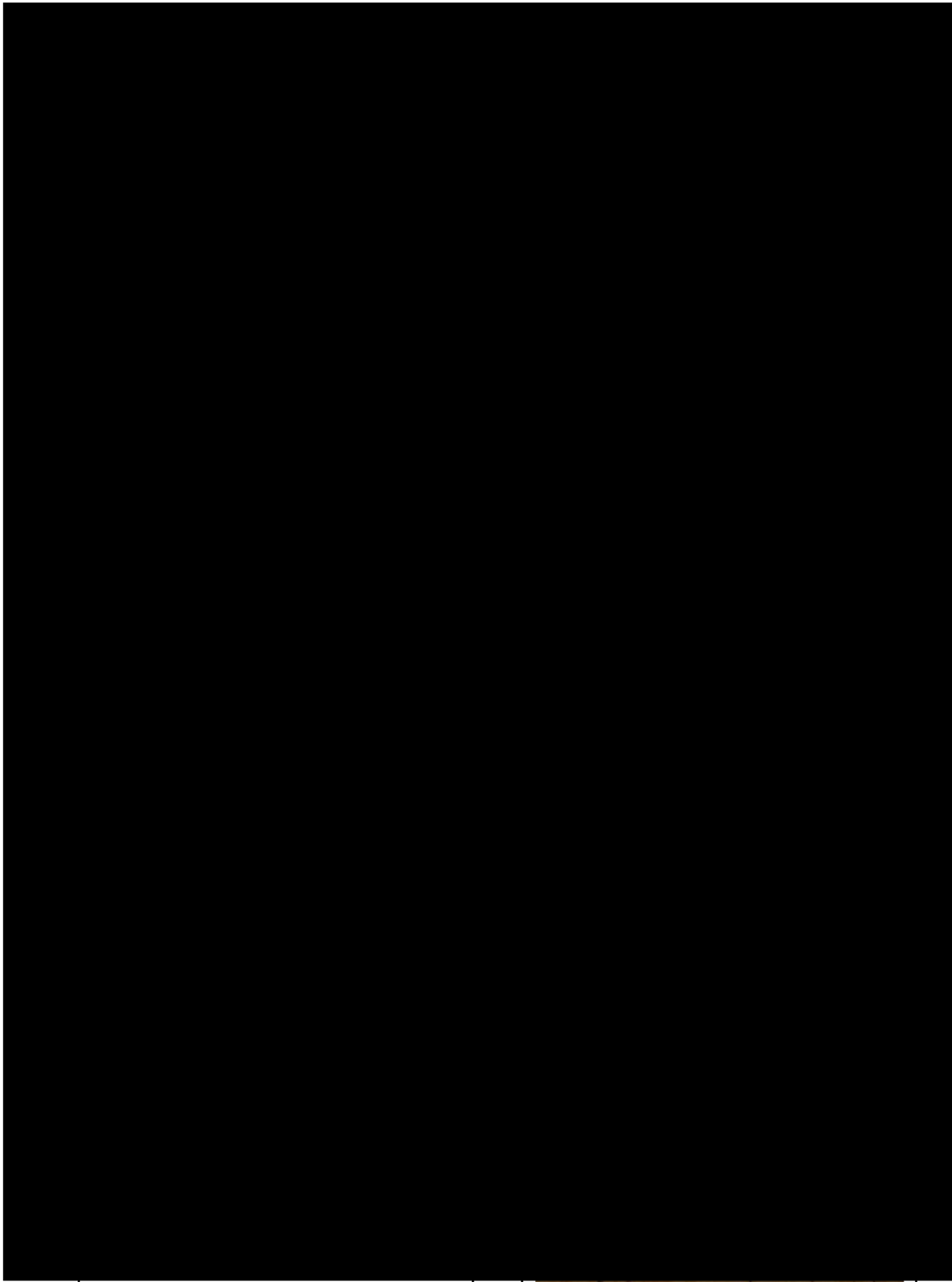
2.3.D Water Storage

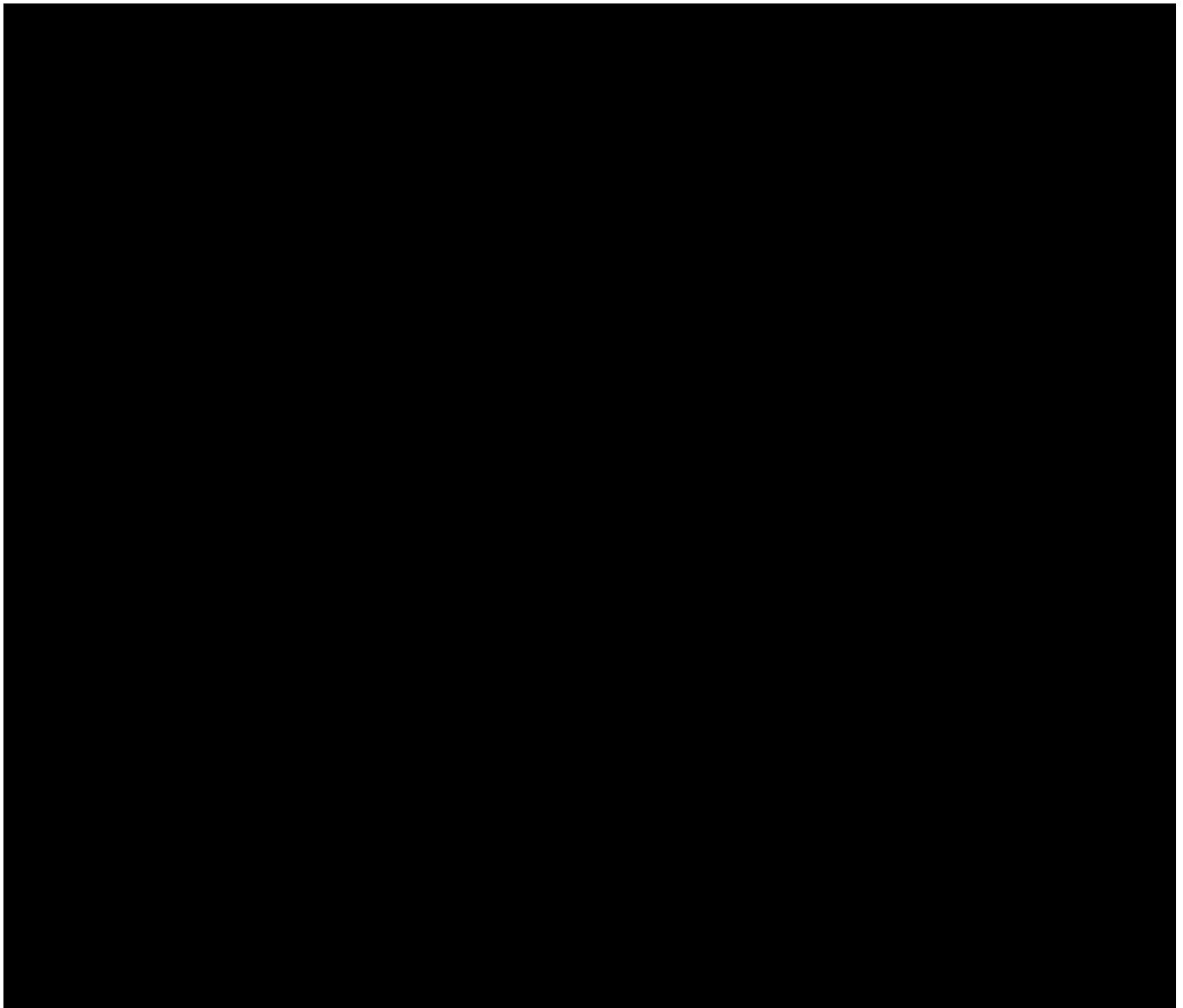
The 160,000 gallon clearwell at the treatment plant and 250,000 gallon elevated water storage tank are both in good condition, adequate and suitable for service well beyond the design year 2038. The pedosphere tank had modifications, along with interior and exterior painting completed in 2008.

In April 2006, the 75,000 gallon water storage tank at the water plant site was inspected for coating (interior and exterior), structure, and evaluate compliance with sanitation guidelines, as well as safety regulations in accordance with AWWA. The following recommendations were made:

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The summary of the report concluded that the tank is in fair to poor condition. The estimated cost for these repairs and painting, excluding any foundation repairs is \$200,000. The paint on the tank exterior contains high lead and chromium metal contents. Removing the exterior paint coating and then repainting the exterior would add an additional \$75,000 to the above estimated cost. This additional cost is due to complete lead abatement procedure to be conducted to remove the existing high lead content exterior paint. The elevated water storage tank located at the water plant site was constructed in 1907 and is not suitable for continued use in its current condition. A copy of this report is located in Appendix D.

On January 4, 2017, a correspondence letter from the Kansas State Historic Preservation Office (SHPO) indicated that the 75,000 gallon elevated water storage tank may be eligible for listing on the National Register.



2.4 **FINANCIAL STATUS OF EXISTING WATER UTILITY**

2.4.A Water Rates

The present water rates charged by the City of Frontenac are adequate to provide the revenue needed to operate the City's water utility.

Water rates are shown in Water and Sewer Ordinance No. 2018-01. This ordinance took affect February 15, 2018. The Ordinance also includes rate increases for Fiscal Years 2019 through 2021 to help fund infrastructure projects, such as those listed herein. A copy of the ordinance is in Appendix E of this report.

Based on the present water rates, Table II-5 shows charges for various amounts of water used.

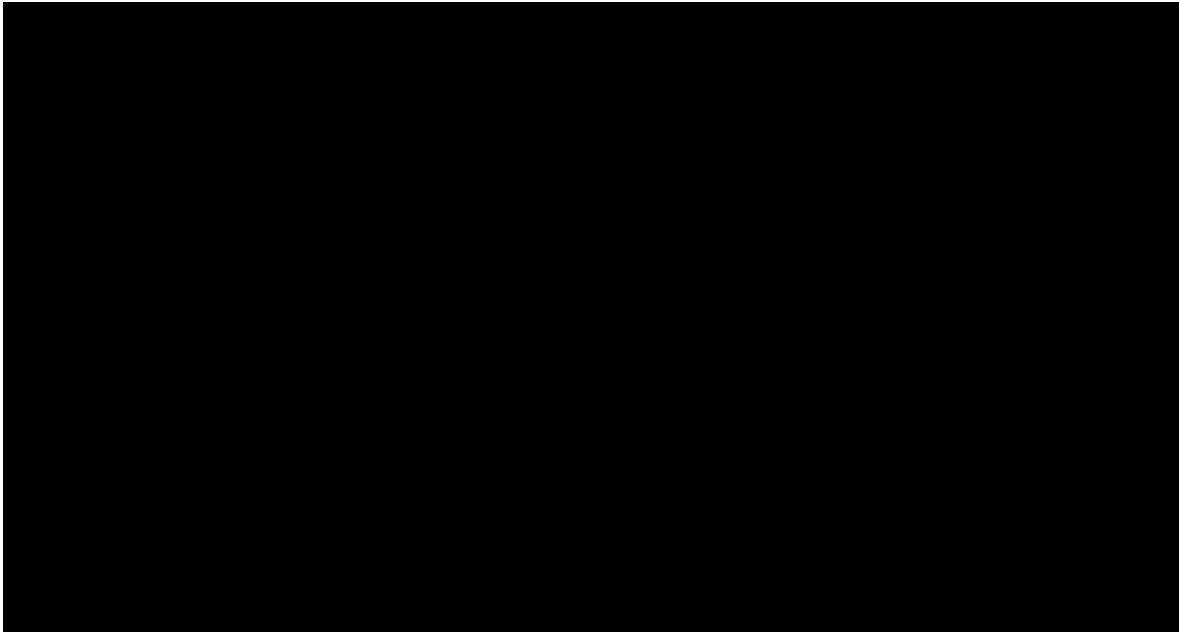
Table II - 5
Water Use Charges

	User Rates			
	2018	2019	2020	2021
Residential Within City Limits				
First 2,000 gallons, minimum charge	\$ 15.53	\$ 17.55	\$ 19.48	\$ 21.23
Per 100 gallons above minimum	\$ 0.50	\$ 0.57	\$ 0.63	\$ 0.68
Total for 5,000 gallons	\$ 30.53	\$ 34.50	\$ 38.29	\$ 41.74
Total for 10,000 gallons	\$ 55.53	\$ 62.75	\$ 69.65	\$ 75.92
Residential Outside City Limits				
First 2,000 gallons, minimum charge	\$ 20.48	\$ 23.14	\$ 25.69	\$ 28.00
Per 100 gallons above minimum	\$ 0.60	\$ 0.68	\$ 0.75	\$ 0.82
Total for 5,000 gallons	\$ 38.48	\$ 43.48	\$ 48.27	\$ 52.61
Total for 10,000 gallons	\$ 68.48	\$ 77.38	\$ 85.89	\$ 93.62
All Businesses				
First 2,000 gallons, minimum charge	\$ 20.94	\$ 23.66	\$ 26.27	\$ 28.63
Per 100 gallons above minimum	\$ 0.55	\$ 0.62	\$ 0.69	\$ 0.75
Total for 5,000 gallons	\$ 37.44	\$ 42.31	\$ 46.96	\$ 51.19
Total for 10,000 gallons	\$ 64.94	\$ 73.38	\$ 81.45	\$ 88.79



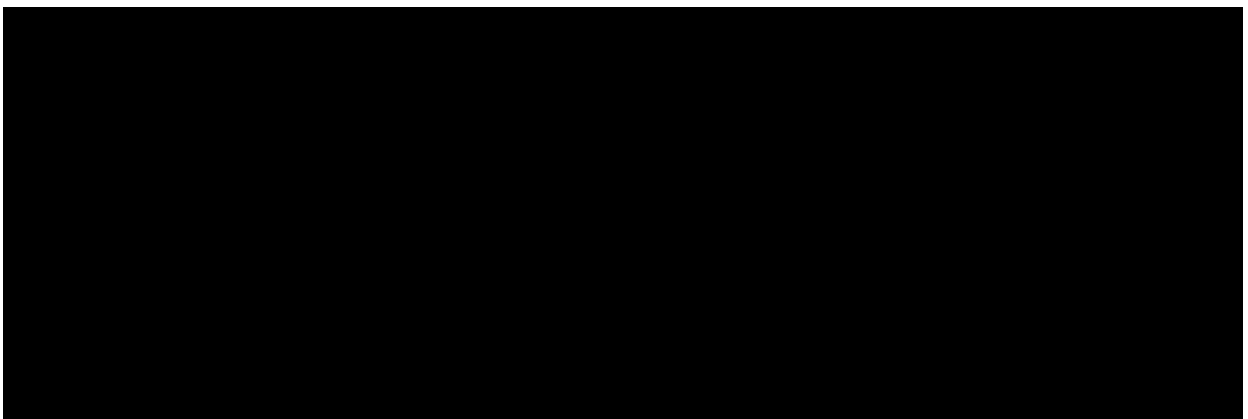
2.4.B Detailed Breakdown of Annual Expenses, Incl. O & M Cost

A breakdown of existing Water Utility Expenses from the 2018 Budget are shown in the following Table II-6. Water Utility Revenue is shown in Section 6.6.



2.4.C Long-Term Debt

In 2013, the City refinanced with a General Obligation (G.O.) Bond to consolidate several higher interest bonds. Water utility loans were included in this bond. Information on the G.O. Bond is shown in the following Table II-7.



Other long-term debt for the City consists of a KDHE SRF loan for wastewater system improvements. The following table shows the Revenue Bond information.



The City currently has no revenue bonds for the water utility.

2.4.D Water Use

Past Frontenac water use data from Municipal Water Use Reports for the last 5 years is shown in the following Table II-9:

Table II – 9
Water Use in 1,000 Gallons

Year	Raw Water	Water Sold	Free Water	Water Loss	% Loss	No. of Meters
2017	109,641	86,917	5,214	17,510	16.0	1,464
2016	108,227	90,156	3,773	14,297	13.2	1,476
2015	106,783	90,252	5,280	11,341	10.6	1,459
2014	116,122	92,775	7,491	15,856	13.6	1,491
2013	115,949	96,704	6,938	12,307	10.6	1,483
2012	123,924	101,511	7,792	14,621	11.7	1,481
2011	130,064	107,056	7,232	15,776	12.1	1,514
2010	118,634	102,465	6,270	9,915	8.3	1,506

The average water loss since 2010 is 12.0%, Water loss is calculated by reading the raw water meter at the plant each month and subtracting the water sold and free water amounts. This unaccounted-for water is moderate, but it has been reduced from 24% in 1999.

The total number of users as of April 2018 is 1,481. Number of users includes 5 churches, 96 commercial, 15 government (free water), 1,351 residential, 3 rural, and 11 institutional meters.

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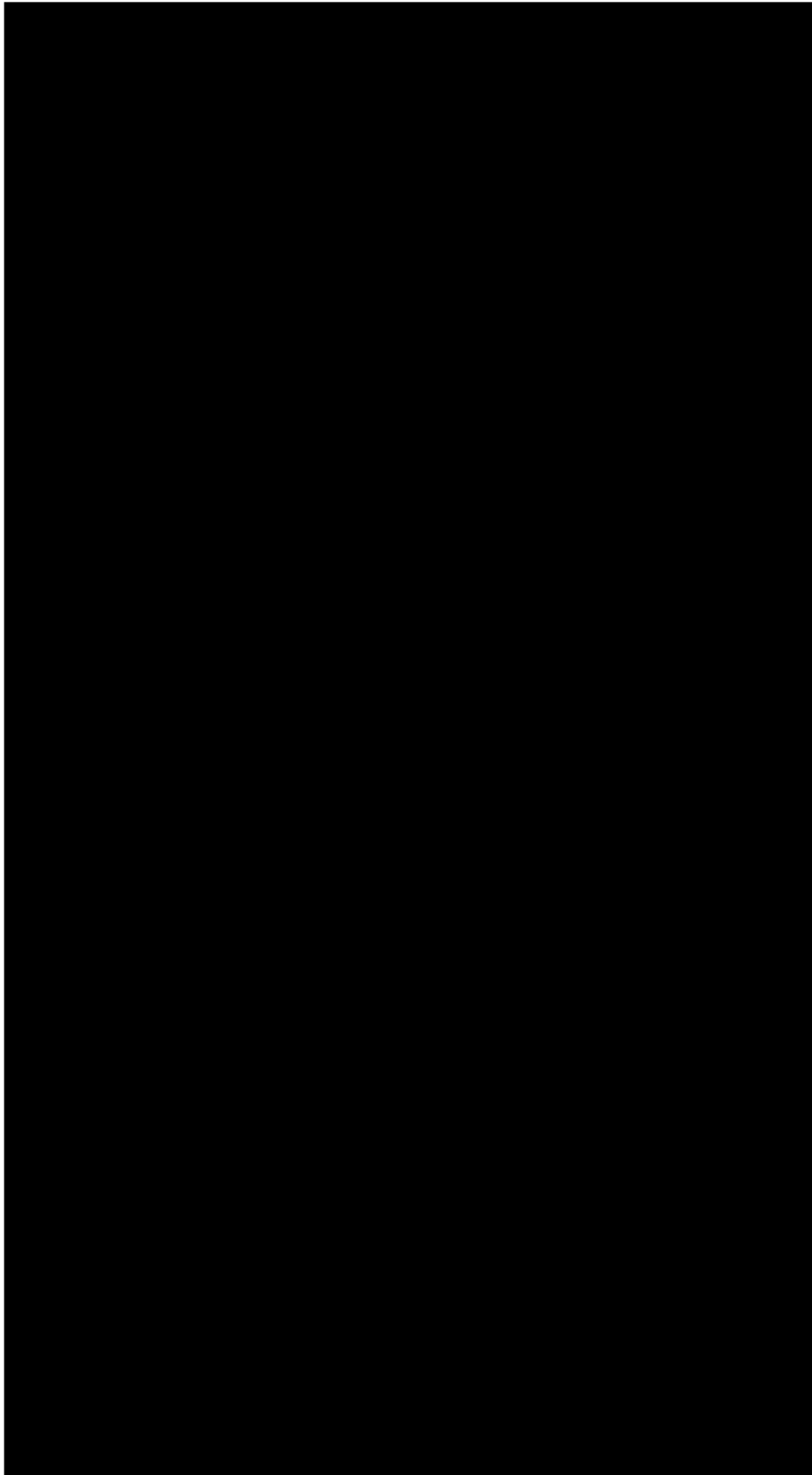




Table II – 10

Maximum Use Months Per Year

Year	Max Gal	Max Month
2009	12,420,000	August
2010	11,985,000	August
2011	13,477,000	August
2012	13,670,000	August
2013	12,415,000	July
2014	11,648,000	May
2015	10,629,000	June
2016	10,755,000	July
2017	11,128,000	June

Max Month in Year 2012
Max Month is August
Gallons in that Month 13,670,000

* * * * *



SECTION 3

NEED FOR PROJECT

3.1 HEALTH, SANITATION AND SECURITY

3.1.A Water Supply

The City's well water supply is considered hard water with high sodium concentration, hydrogen sulfide and a relatively small amount of combined radium concentration. The hydrogen sulfide levels are high enough to be corrosive to piping systems. The water is characterized as hard to very hard water as it contains approximately 300 parts per million total hardness as calcium carbonate (CaCO_3). A desirable level of hardness for a municipal water supply with domestic, industrial and commercial uses is 100 to 130 parts per million. The goal for water treatment for hardness removal is to provide water with a hardness near 120 mg/L as CaCO_3 .

Sodium concentration in the water supply is considered an inorganic chemical and is monitored. The recommended secondary maximum contaminant level is 100 mg/L. Currently, the City's water supply is above the recommended level. Sodium has ranged from 95 mg/L in 1995 up to 150 mg/L in 2016, and Well No. 3 raw water shows a level of 170 mg/L from a grab sample. Sodium is a dietary concern for some persons, which can cause health issues such as high blood pressure.

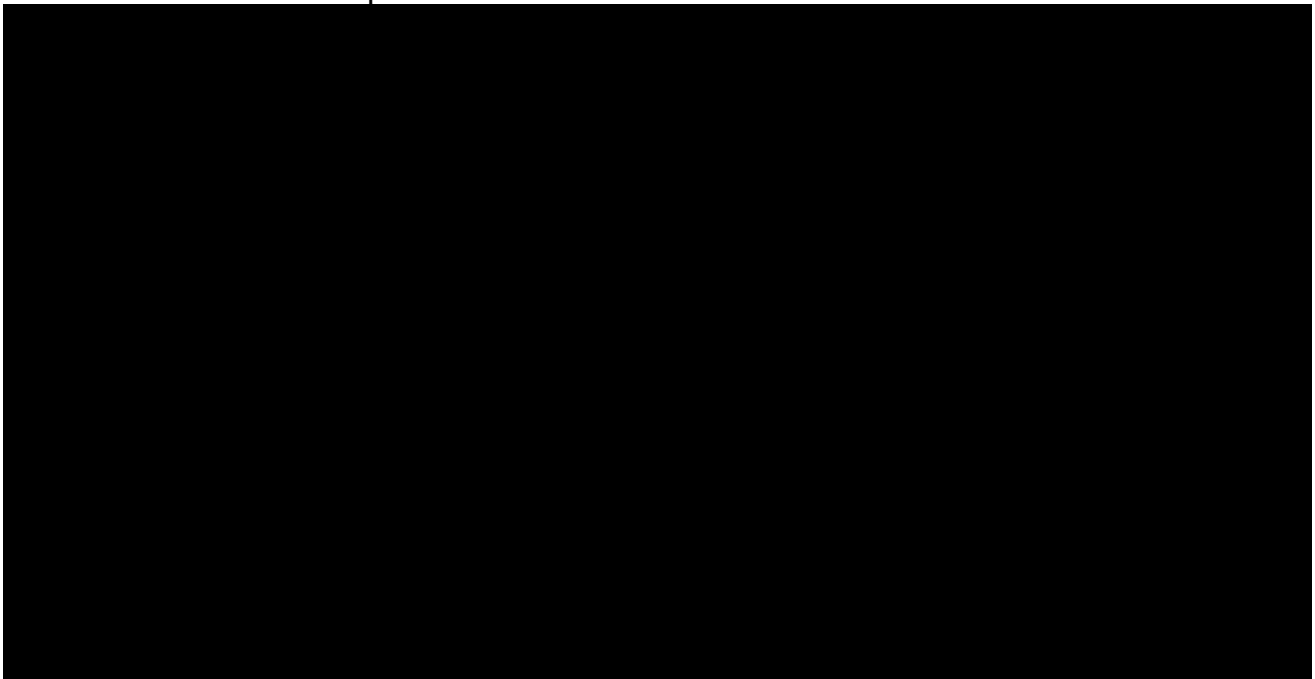
Hydrogen sulfide can cause pipe corrosion, mineral scaling in systems, microbiological regrowth, as well as taste and odor problems. The City's water supply contains approximately 12 mg/L concentration of hydrogen sulfide. The City's current treatment technique using aeration and settling removes the hydrogen sulfide from the water but emits an odor during the process. This odor has been a concern and offensive for neighboring citizens, especially while at the ball diamond across the street to the north of the water treatment plant.

The Radionuclide Rule, published by EPA on December 7, 2000, revised new requirements for public water supply systems to set the MCL for combined radium at 5 pCi/L. Combined radium has been exceeded for the prior 4 samples on a RAA, with the first violation received by the City from KDHE on December 18, 2017, the second violation on January 26, 2018 and the third violation on May 1, 2018. Exceedance violations require the City to issue notices to customers for each violation.



High concentration of radium in water or long-term exposure to lower levels of radium can cause certain cancer types including bone, breast and liver cancer. Short term exposure of small concentrations of combined radium in drinking water does not pose a significant risk. Consuming water with the concentration of combined radium at the MCL for one year is said to be equal to that of a single chest X-ray. However, long term exposure to drinking at this level or above could potentially increase the risk of cancer. Normal household tasks are not affected, such as washing dishes or doing laundry. When decaying, radium can create radon gas which is present in the air stream. Radon gas in the air is a leading cause of lung cancer. “EPA Facts about Radium” fact sheet is located in Appendix F.

In accordance with the City’s public water supply permit, they are required to routinely sample the system. Listed below are water system violations since the water treatment plant was constructed in 1991.



The majority of the violations were due to sampling violations, and not necessarily related to water quality, health or sanitation concerns.

Frontenac’s treated well water is currently safe to drink, but due to the exceedance of combined radium and long-term health risks associated to it, there is a need for a water softening to reduce the contaminant to below the MCL. The current treatment only removes hydrogen sulfide and disinfects.

[Redacted line]

[Redacted line]



3.1.B Water Treatment

Improvements and replacement of failing water treatment plant equipment, filter media, controls and plant items that need upgraded are required to provide safe water treatment. [REDACTED]

[REDACTED]

Hydrogen sulfide (H₂S) odor control unit is needed to remove the H₂S gas from the aerators exhaust discharge air stream. The H₂S gas smell is very obnoxious and unpleasant. The City continues to receive complaints about this odor. A new waste stream will be generated by the H₂S control unit and it is proposed to send the new waste stream to the filter backwash waste sump for disposal along with the existing process wastewater streams. The proposed method of disposal was in principle accepted by KDHE based on the agreed upon consensus outcome of the formally completed waste stream summary review and disposal method consensus process.

Water softening will improve water quality and reduce the concentration of combined radium. It is imperative that the City be able to meet the MCL for combined radium in order to provide safe drinking water to their users, and to meet EPA regulations. Water softening will also allow the City to provide softer water to expand the longevity of household appliances among other positive results. The proposed method of disposal was in principle accepted by KDHE based on the agreed upon consensus outcome of the formally completed waste stream summary review and disposal method consensus process.

3.1.C Water Distribution System

Due to line breaks and failures in the recent past, there are health and sanitation concerns. When a line breaks, the service in that area must be shut down as soon as practicable and repaired. The repairs made must be flushed in order to put the utility back into service, and with valves not operating properly, it is tough to get the lines flushed correctly without users receiving dirty water from the repair.

The minimum pipe size for fire flow is 6 inch by KDHE minimum design standards. Some areas of the City do not have 6 inch waterlines to allow pump hydrants for fire suppression.

The City does not currently have updated water distribution maps. It is very important to have quality water maps, and to update them as new appurtenances are added, such as meters, line extensions, valves and hydrants. It is recommended to updated water distribution maps.



3.1.D Existing Water Storage

The existing 75,000 gallon elevated water storage tank was constructed in 1907. It is located within the fence boundary on the water treatment plant site. An April 2006 inspection of this tank indicated that interior and exterior painting is needed and extensive tank repairs are required, especially to the roof. Also, modifications are required to bring the tank into compliance with current paint and safety standards. The tank needs to be repaired or replaced to provide for safe and sanitary water storage. However, an environmental review was conducted by the Kansas State Historical Preservation Office (SHPO) which indicates that it may be eligible for the National Historical Register. SHPO would need to investigate for final determination.

The 250,000 gallon elevated water storage tank on the west side of the City limits located near the industrial park has been repaired and painted in 2008. There is a need for a tank inspection report to determine any repairs that need to be made as well as determining if the interior and exterior paint is adequate. The tank site is not fenced but is recommended for security.

3.2 AGING INFRASTRUCTURE

[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]

3.2.B Water Plant

The water treatment plant has been in operation for over 27 years. Items needing to be replaced due to age and needed for upgrade are shown in Section 2 of this report. Improvements and replacement of certain items in the water treatment plant are needed to provide safe water treatment to meet EPA and KDHE water quality standards. With improvements, the water plant should be suitable for use through the design year of 2038 without major improvements, based on present State and Federal regulations.



3.2.C Water Distribution System

The original water distribution system was installed in the early 1900's. The majority of the City's current water mains are CIP and DIP. There are water mains, valves, hydrants and appurtenant items that need to be replaced in order to continue supplying an adequate, un-interrupted service to the water users.

3.2.D Water Storage

The 75,000 gallon elevated water storage tank at the treatment plant site is over 111 years old and needs replaced. Due to aging, the storage tank and supporting structure are in very poor condition, which needs major repairs and removal of lead base paint. It is not economically feasible to repair this tank due to exceeding its useful life and the cost for repairs.

The tank is considered unsafe and not suitable for continued use through the design period without proposed improvements listed herein.

3.3 REASONABLE GROWTH

There has been a steady growth in population served and water demands for water in the planning area served by Frontenac's water facilities.

3.3.A Future Demands for Water

In order to establish reasonable design criteria for the various components of the water supply, treatment, storage and distribution, it is necessary to establish present and estimate the future demands for water. "Demands for Water" is defined as the sum total of the requirements of all the consumers served by the water utility, which includes residential, business and also all leakages, municipal uses and firefighting requirements. It is the obligation of the water utility to supply this demand at all times without restraint or restriction.

There are various types of demands for water used in sizing the water supply, storage and treatment plant, each having a separate meaning in waterworks nomenclature. The various types of demand are listed as follows:

- Average daily demand is a mathematical relation inasmuch as there is no such thing as an average day. The value is measured only of the normal requirements imposed on the water supply and treatment plant.



- Maximum day demand is also a mathematical conception, but it comes nearer to being a measure of the capacity of the water source and water treatment plant necessary to supply water and in the case of some parts of the plant, it may be the exact measure.
- Instantaneous water use is an estimate of the maximum amount of water being used within the water system at any one instance in time. The water distribution system must be capable of meeting the maximum demand placed on it to prevent low pressures within the system and also to provide adequate service to all water users. The peak instantaneous use is the ultimate and final measure of the size of waterworks required to supply water, for it is axiomatic that the system must supply demands of the consumer at all times.
- Fire demand is an estimate of the amount of water that may be required to fight a major fire within the City. The Insurance Services Office (ISO) has set forth certain standards for estimating the fire demand in cities, based upon their population, building construction, etc. Fire demand must be added to other users.

There are so many factors affecting water demands that an exact projection of future water use is impossible. Some of the factors affecting water use are changes in population, quality and quantity of water available, weather conditions, cost of water, economic and agricultural conditions and water conservation measures. However, using population and past water use data, a reasonable projection of future water use can be made for facilities design and operational costs.

Should the City experience a large industrial growth or a larger increase in population than projected, it may be necessary to expand the municipal water system beyond those improvements planned herein. The initial construction and proposed improvements as outlined in later parts of this report include a reasonable capacity that will provide time for expansion of the plant if greater demands than anticipated now are encountered in the future.

Water use during the last eight years in Frontenac, based on water sold, has ranged between 69 and 87 gallons per capita per day (gpcd) with an average of 78 gpcd; whereas per capita water treated has ranged from 85 to 105 gpcd, with an average of 94 gpcd.

The maximum water production month during the last eight year period was 13,670,000 gallons in August 2012. This calculates to be an average of 440,970 gallons per day and the peak is likely to be 1.5 to 1.8 times the average day for the maximum month, or 661,450 to 793,750 gallons for the maximum day.



Based on water production from 2013 through 2017, 305,000 gallons per day is the average water production per day. Free water is water used at ball diamonds, water plant and flushing fire hydrants.

It is recommended the City plans on supplying an average of 80 gpcd for water sold and 95 gpcd for water treated through design year 2038. The water treated amount is based on the City keeping water loss below 15%, which has been achieved for the last nine years.

This increase in meters will allow for future growth, while still remaining a conservative estimate. The existing number of water meters served by Frontenac, and the projected number to be served in the design year of 2038 are shown in Table III-2. The City's projected population is expected to increase 12.8% over the design period, however this study will assume a 10% increase in the number of meters served by year 2038.

Table III – 2

Water Meters, Present and Design

<i>Year</i>	<i>Residential</i>	<i>Commercial</i> ^[1]	<i>Church</i>	<i>Rural</i>	<i>Institutional</i>	<i>City</i> ^[2]	<i>Total</i>
2018	1,351	96	5	3	11	15	1,481
2038	1,486	105	6	4	12	17	1,630

^[1]Includes 2 high water users

^[2]City meters receive free water and includes 4 meters at cemeteries

The projected new water use for Frontenac for 2038 is 135 million gallons per year. The City has current water rights from all three wells together for up to 188.5 million gallons per year.

The maximum day demand will occur during periods of drought and hot weather conditions. The periods of heavy demands for water can be expected to last a few days to several weeks. The water supply source and water treatment plant must be adequate to supply the anticipated maximum day demands.

Based on past water use data and for cities the size of Frontenac, data and experience has shown that the maximum day usage ranges between 150 to 180 percent of the average day demand during maximum use month. Therefore, the maximum day demand for water for Frontenac has been estimated to be 180% of the average day demand, or 665,000 gallons in design year 2038.

The maximum hourly, instantaneous and fire flows will be provided by the City's elevated water storage tanks, clearwell water storage, water distribution system and water from the treatment facilities.



By replacing and/or upgrading existing aging water supply, treatment facilities, water distribution system and water storage, the water utility will be sustainable to meet the planning area needs through the design year 2038, with the majority of the components lasting well beyond the design year.

* * * * *



SECTION 4

WATER SYSTEM IMPROVEMENTS

ALTERNATIVES CONSIDERED

4.1 DESCRIPTION

4.1.A Water Supply and Treatment

4.1.A.1 *Sharing Services*

Frontenac has had recent conversations and meetings with the City of Pittsburg about connecting their system to Pittsburg's for a permanent water supply source and removing Frontenac's supply and treatment works from service. However, each City has their own suitable and adequate supply and it was not practical for either City to provide water for both cities or abandon their present water service.

The City of Frontenac has determined it is not economically feasible to abandon their water supply and treatment system to obtain water from another source. The City of Frontenac provides water to Crawford County RWD No. 1 through an emergency connection. When necessary, the water district is able to obtain water from the City.

In the past, Frontenac contracted to supply water and maintain the water system in the Capaldo area. The City has now annexed Capaldo and the Capaldo water system is part of the Frontenac water system.

Franklin area and City of Arma, both located north of Frontenac, have a combined water supply with RWD No. 1. Due to the size of Frontenac, it is not practical for these systems to combine services or management.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

It is recommended to add variable frequency drives to the well pumps in order to preset operation rate.




4.1.A.3 Water Treatment Plant

The only water treatment alternative considered feasible and cost effective is to continue to use the City's present water treatment plant with improvements recommended herein, with the addition of odor control and softening.

Upgrading the City's existing water treatment consists of improving the existing plant by replacing worn and outdated equipment. H₂S odor control and softening is included with the plant upgrade.

The following plant improvements list shows the principal components of the plant upgrade.



There are three types of Best Available Technologies (BAT) for softening listed in KAR 28-15a-66, which adopts provisions from USEPA 40 CFR 141.66. The three types are as follows:

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Softening for Combined Radium Removal Alternatives:

a. Lime Softening

There are three types of lime softening chemical addition alternatives to consider: lime, lime-soda ash, or caustic soda. The chemical addition is determined by the water quality and treatment cost. Since Frontenac has little to no noncarbonate hardness in the water quality tests, the addition of lime only is the best chemical to use based on cost and treatment.

Lime would be added to water in a solids contact basin, which would be placed after the water has been aerated and settled in the chlorine contact basin. Once the lime has had time to react with water and settle in the solids contact basin, the water would then need to be recarbonated to bring the pH back to acceptable levels. Once the recarbonation process has completed, the water would then be filtered through the updated plant filters.

Beneficial use of softening solids consists of fertilizer, soil conditioners, liming material, or used to stabilize, neutralize, solidify or treat waste for ultimate disposal, treat wastewater or sludge, stabilize hazardous substances or serve as landfill construction material.

b. Ion Exchange

Ion exchange treatment is where the raw water is passed through a pressure filter bed of an exchange material where insoluble ions exchange with ions in the water. There is typically little to no hardness present in the water post-treatment, therefore blending the water would be necessary by bypassing some of the flow around the ion exchange treatment and blending later in the filter process.

Once the ion exchange material reaches full saturation, the material is regenerated, typically triggered by a preset alkalinity effluent limit.

This process uses very little water as waste, but it is a 5% concentration of sodium chloride (NaCl) waste stream, which could potentially cause wastewater treatment issues.

Ion exchange would increase sodium levels in the treated water, which is not acceptable due to the concentration of sodium already present in the water at $107 \pm$ mg/L, therefore this method is not considered technically feasible.



c. Reverse Osmosis

Reverse osmosis, generally referred to as RO, is typically used when there are a lot of harmful constituents in raw water. This treatment technology has approximately a 25% waste stream generated. Reverse osmosis does, however, reduce sodium levels in water because it does not add sodium for the removal or regeneration process. Due to the high amount of waste generated from this treatment, it is not considered technically feasible.

d. Conclusion

Lime Softening is not only considered a BAT for Uranium and Combined Radium removal but is also considered a Small System Compliance Technology. Reverse Osmosis, is also BAT and Small System Compliance Technology, but has a much higher operating cost in comparison to lime softening, and generates a larger waste stream.

4.1.B Water Distribution System Improvements

There are spot areas of concern in the City's water distribution system for water mains, valves, hydrants and appurtenances. Due to the age of piping, valves and hydrants, they must be replaced in order to serve the utility through its useful life. During the preliminary design phase, a hydraulic analysis will be evaluated to determine if the current distribution system piping is adequate in size to supply pressure and demand base on KDHE minimum design standards. If there is a need for enlarging the water mains in the spot areas mentioned, it will be addressed during the hydraulic analysis. Enlarging the water main would not significantly increase the cost of the project.

Distribution system mapping with high accuracy Global Positioning System (GPS) and high resolution aerial imagery provide operators and City Staff with quality maps. Data should be collected with GPS for all water mains, meters, valves, hydrants and other appurtenant items for mapping purposes. All data should be collected and provided on large format printed, high resolution maps with up to date background aerial imagery, with individual smaller size prints to show higher detail at a smaller scale. Pages should be bound in a book with a relevant table of contents, and the large format maps should indicate what sheets to view in the book.



4.1.C Water Storage

Additional treated water storage is needed for maintaining adequate water service, fire protection flows and water supply during plant shut down for maintenance or caused by power outage. Alternatives for water storage is outlined below:

a. Pumped Ground Water Storage Tank

- 1) Provide 250,000 gallon in ground concrete water storage tank.
- 2) Provide high service pumps and generator for pump operation during power outages.
- 3) Piping, valves, controls and electrical.
- 4) The initial cost for the groundwater storage tank, pumps, piping, controls and structure to house pumps would be high. Also, operation and maintenance for in ground pumped storage would be higher than elevated water storage tanks, due to the cost of operation for electrical service and maintenance. Therefore, because of the cost and limited use, this alternate has been eliminated.

b. Composite and Fluted Column Elevated Water Storage Tanks

- 1) Both of these types of water storage tanks are generally used for larger volumes, 500,000 gallons or more. Therefore, no further analysis of these types of water storage tanks will be considered.

c. Pedisphere Elevated Water Storage Tank

- 1) The Pedisphere is often referred to as a single pedestal tank. Standard capacities for this type of tank range from 50,000 to 1,500,000 gallons.
- 2) Tank and pedestal are constructed of steel and tank foundation is reinforced concrete.

d. Multi-Column Elevated Water Storage Tank

- 1) The multi-column elevated water storage tank is often referred to as a legged tank. These tanks standard capacities range in size from 25,000 to 2,000,000 gallons.
- 2) Tank and supporting legs are constructed of steel and tank foundation is reinforced concrete.



Both the pedesphere and multi-column elevated water storage tanks are viable options. Life cycle cost analysis, along with other factors, must be performed in order to determine which option is most feasible. Section 5 of this report reviews the life cycle cost analysis between these two alternatives.

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4.2 DESIGN CRITERIA

The design criteria for the Frontenac water utility is shown in the following table:

Table IV – 1
Design Criteria

Design Year	2038
Population 2018	3,450 persons
Design Population	3,890 persons
Existing Services	1,481 meters
Design Services	1,630 meters

Water Treated

Average Daily Demand	370,000 gallons
Maximum Daily Production	840,000 gallons
20 hours at 700 gpm	

Water Sold

Average Daily Demand	311,200 gallons
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Water Supply

Treatment Plant Rate	700 gpm

Fire Flow

Residential Area	500 gpm
School Area	750 gpm
Commercial Area	1,000 gpm
Fire Flow, 2 hrs.	120,000 gallons

Water Storage

2-Day Average Use Plus	860,000 gallons
Fire Flow (Recommended)	
Current Storage ^[1]	485,000 gallons
Proposed Additional Storage	250,000 gallons

^[1]Includes 160,000 gallon clearwell, 250,000 gallon and 75,000 gallon tanks

Existing water supply and water treatment plant operating at a rate of 700 gpm, will meet average day demand in 8.8 hours of operation in design year 2038.



The projected water use for Frontenac for 2038 is 135 million gallons per year. [REDACTED]

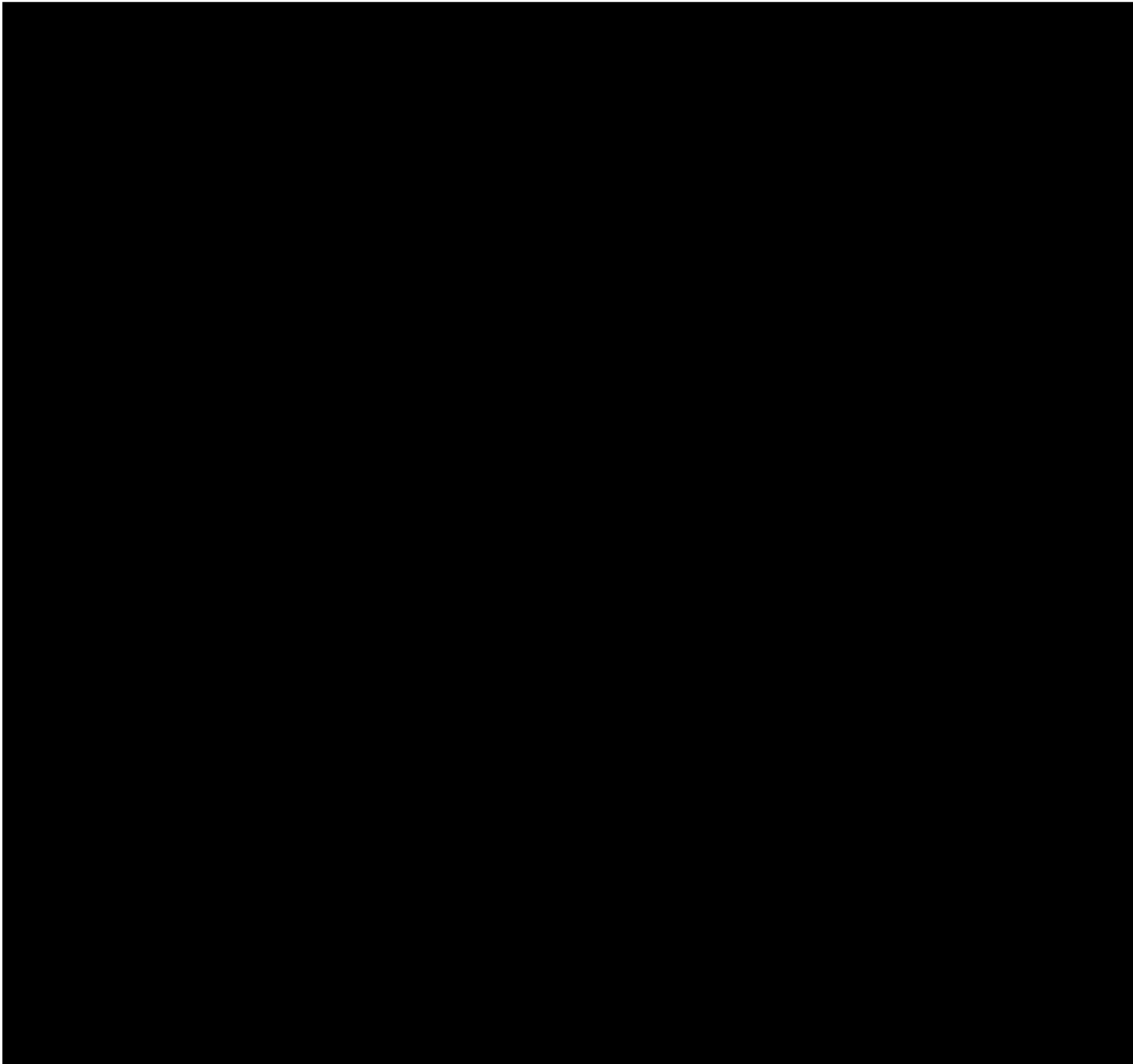
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Proposed 250,000 gallon additional water storage would provide a total of 735,000 gallons of water storage, which is still 125,000 gallons short of the recommended amount of water storage for providing the two day average plus two hour fire flow demands. However, at this time with the current number of users, it is not considered cost-effective to provide the total amount of recommended water storage. As population increases, a re-evaluation of water storage need is recommended.

The maximum hourly, instantaneous and fire flows will be provided by the City's elevated water storage tanks, clearwell water storage, water distribution system and water from the treatment facilities.

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4.4 ENVIRONMENTAL IMPACTS

All alternatives will have a minimal impact on the environment, except to improve the environment by providing better quality water and to control odors of hydrogen sulfide gas will improve air quality, as well as lime softening to reduce hardness and Combined Radium. Hydrogen sulfide gas removed from the well water supply at the aerators and has a smell similar to rotten eggs. The water treatment and water storage tank sites are not in a floodplain or wetland area. Plant facilities and water towers are compatible with the surrounding areas.



There are no important land resources, endangered species, historical or archaeological properties in the treatment plant or water storage tanks sites.

Waste stream flows from the water treatment plant and all waste streams from alternates considered to improve the plant will be discharged to the Frontenac wastewater systems. The existing plant waste streams discharges to the wastewater systems and have not caused any waste treatment problems.

A new waste stream will be generated by the H₂S control unit and it is proposed to send the new waste stream to the filter backwash waste sump for disposal along with the existing process wastewater streams. Another new waste stream will be generated by the solids contact basin blowdown, which will be sent to the belt filter press for dewatering where solids will be land applied at an approved landfill, and the remaining water will go to the filter backwash waste sump for disposal. The proposed method of disposal was in principle accepted by KDHE based on the agreed upon consensus outcome of the formally completed waste stream summary review and disposal method consensus process on July 9, 2018. The consensus is included in Section 6 of this report.

On December 20, 2016, an environmental review was conducted for the City's proposed improvements herein, excluding the water softening treatment technique. An Environmental Report was completed February 13, 2017 and was revised March 1, 2017. A copy of this Environmental Report, including environmental review responses is attached in Appendix G. There were no concerns regarding the City's proposed improvements. A new environmental review will be conducted in the fall of 2018 after KDHE has reviewed and approve this Preliminary Engineering Report.

4.5 LAND REQUIREMENTS

The existing water plant site is of sufficient size to allow for construction of any of the proposed water treatment plant alternates. No land will need to be acquired for water plant improvements.

No additional land will be needed at the existing 250,000 elevated water storage tank in the Industrial Park for installation of tank controls. There will also be no land acquisition required for the existing 75,000 gallon elevated water storage tank improvements.

The alternate for a new additional elevated water storage tank will be constructed on existing land owned by the City. The site is a large, unused area between a parking lot and ball diamond.



4.6 POTENTIAL CONSTRUCTION PROBLEMS

The only problem with construction of the water improvements is to be certain that the plant improvements do not disrupt water treatment process long enough to interrupt water service. This may require some temporary piping and proper scheduling of plant work. This type of construction problem is not a major problem, but usually encountered in plant expansions.

There should be no major problems with construction of water supply, treatment, storage or distribution improvements listed herein.

4.7 SUSTAINABILITY CONSIDERATIONS

[REDACTED]

All water plant improvements will require minimal additional energy requirements. By use of VFD's on high service pumps, energy consumption can be reduced by lower pumping rates when possible. [REDACTED]

Some additional energy will be required for order control system to pump low pressure air, and softening equipment will require additional energy. This amount of energy is minimal or negligible when determining annual operation and maintenance costs.

Water reuse is not considered feasible due to cost of equipment and energy cost.

All alternatives have redundant equipment and a standby generator is provided in case of power outages, that will run the entire plant and well supply.

The proposed water treatment alternatives are all considered to be sustainable through the design period with routine maintenance and equipment replacement if necessary.

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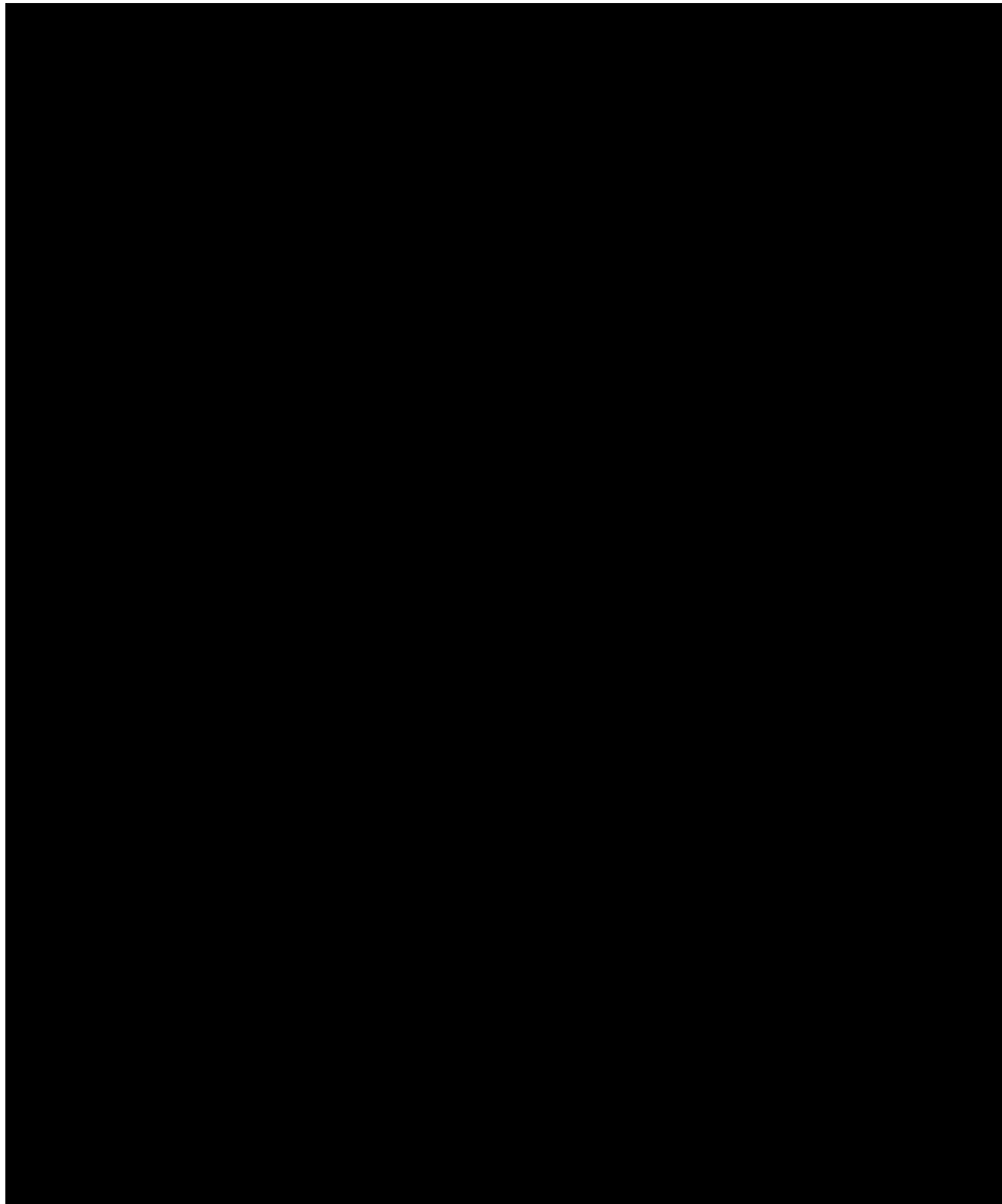
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SECTION 6

PROPOSED PROJECT

RECOMMENDED IMPROVEMENTS

6.1 PRELIMINARY DESIGN

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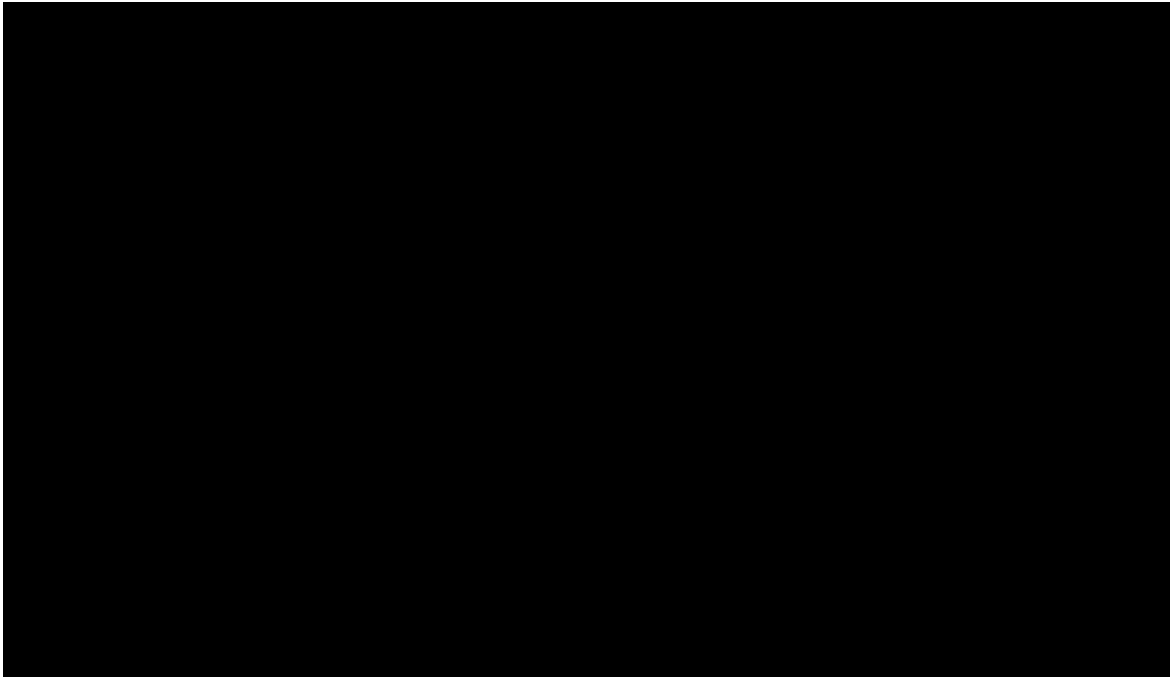
6.1.B Water Treatment

Upgrading the water treatment plant with appurtenant items, while adding hydrogen sulfide gas air scrubber and providing lime softening are the recommended improvements for water treatment.

The present treatment plant is designed to operate up to 1,050 gpm and is presently being operated at 700 gpm. The treatment process and treatment units are described in Section II.



Principal items recommended for upgrading water treatment plant and odor removal are listed as follows:



6.1.C Water Distribution System

Replacing water mains, valves, hydrants and appurtenances in areas distinguished as problematic areas by the City Staff is proposed herein. There is approximately 21,500 linear feet of water mains which needs replaced, along with the valves and hydrants, water meters, and appurtenant items that will need to be completed during the construction. It is also proposed to have an alternate bid to include Automatic Read Meters (AMR) for the City to have more accurate water meter readings, and to save time and cost on meter readings, which are done monthly.

The water distribution system improvements are needed; however, the City has expressed concerns of total project cost which puts a financial burden on user charges. This concern leaves the distribution system as the final alternative to the proposed project, as the other projects are higher priority for the City. If during the bidding process, the other projects listed herein bid for less than anticipated, the City would like to move forward with water distribution improvements listed.



6.1.D Water Storage

A 250,000 gallon pedestal elevated water storage tank is the recommended alternative to provide the additional water storage needed to supply a two-day average water use and increase fire flow capacity.

It is also recommended that the City make appropriate repairs to the existing 75,000 gallon elevated water storage tank.

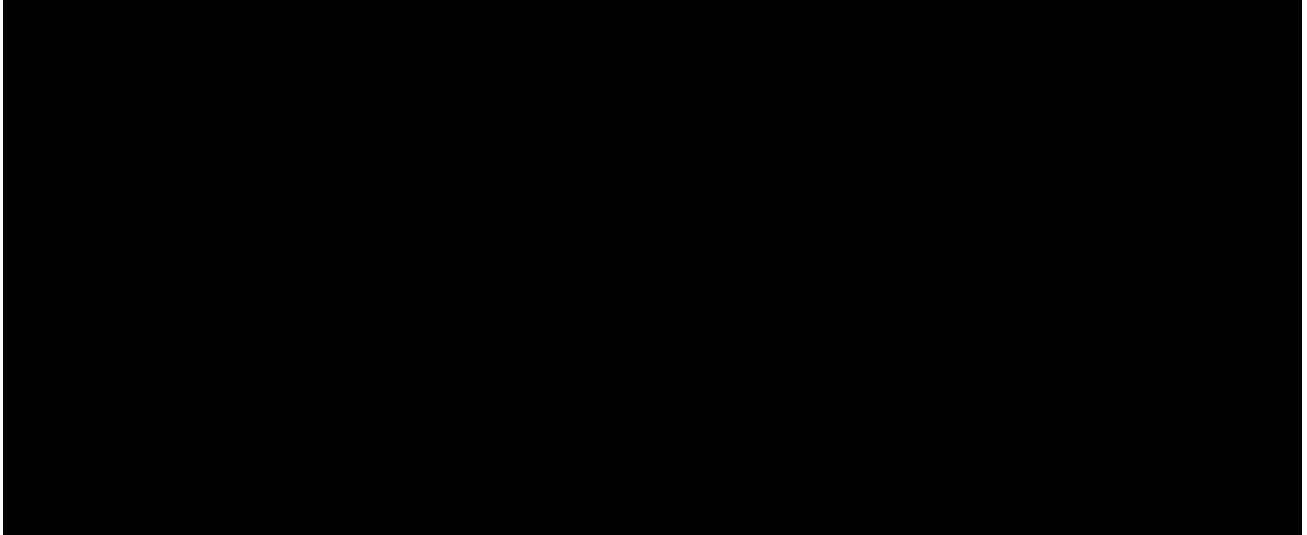
The new water storage tank is to be constructed on land Frontenac owns, northeast of the water treatment plant in the area between a ball diamond and adjacent to the northwest corner of a parking lot. The tank will have a reinforced concrete foundation, single steel pedestal and 250,000 gallon tank with 100 foot height to the low water line.

Waste Stream Summary Review Consensus

The Waste Stream Disposal is located in Appendix H. Shown below is the consensus from the Waste Stream Summary Review process through KDHE.

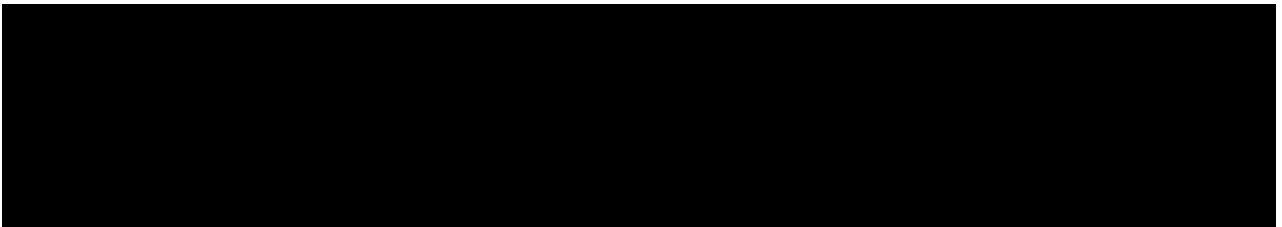
“An agreed upon accepted consensus outcome pertaining to the environmentally responsible disposal of this project’s waste streams based on the June 4, 2018 submittal received on June 4, 2018 has been reached.

This waste stream summary review is a revisit of the original review previously completed on May 16, 2016 because the city elected to include lime softening, recarbonation and a belt filter press in addition to a hydrogen sulfide (H₂S) air/liquid scrubber unit to better enhance the treatment and waste reduction capabilities of its water treatment plant.



Domestic wastewater from the water treatment plant is separately discharged to the city's sanitary sewer collection/treatment system along McKay Street. The only floor drain is in the laboratory and it's primarily utilized when mopping the floor. The laboratory sink drain is connected to the domestic wastewater drain system.

Process wastewater and domestic wastewater separately discharge to the city's sanitary sewer collection system for the wastewater treatment system as they are not directly interconnected.



While it is recognized that the city's sanitary sewer treatment system is permitted to discharge under a current NPDES permit, the permit will be subject to review and revision should the additional wastewater load to the facility become problematic for the city. Should that be the case, the formal submission of a revised NPDES wastewater permit application for review would be required. Additionally, submission of an anti-degradation study for review may also be required prior to the issuance of a revised National Pollutant Discharge Elimination System (NPDES) Permit by KDHE.

Please note that any changes in the project, e.g., treatment, waste streams, storage, distribution and pumping, siting/land acquisition, for example, will necessitate revisiting the formal waste stream summary review and disposal method consensus process with a submittal revised accordingly.



Please be sure to incorporate the agreed upon consensus outcome from the formal waste stream summary review and disposal method consensus process in all project related documents from here forward. Where a report, memorandum or the like is to be prepared and issued, it is recommended that a copy of the final document that was submitted for the formal waste stream summary review and disposal method consensus process also be included by way of a separate appendix.

Lastly, we respectfully clarify that this correspondence does not in any manner convey immediate KDHE approval to initiate disposal of waste generated by this project. It is strongly recommended that all permits relevant to this project be properly secured prior to letting bids for construction or actually starting construction, but without exception before initiating the disposal of any waste generated by this project. The responsibility for securing all relevant permits rests solely with the public water supply system and their consultant.”

6.2 **PROJECT SCHEDULE**

The proposed project herein is subject to obtaining adequate funding to complete all aspects of the project. The proposed project will be bid separately in order to receive the most accurate contractor bids possible. The table shown below represents an estimated time-frame with the appropriate number of days to complete the task.

Table VI – 1
Proposed Project Schedule

Item	Days (cumulative)
Completing Project Planning	<1 year post funding
Bid Opening	60 days (425)
Notice of Award	60 days (485)
Start Construction	60 days (545)
Completion of Construction	560 days (1105)

The proposed project schedule takes into consideration for appropriate review time by agencies and funding sources. Estimated completion of all proposed improvements from the date of acquiring funding is approximately 3 years.

(The remainder of this page intentionally left blank)



■ [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]
[REDACTED]
[REDACTED]

6.4 SUSTAINABILITY CONSIDERATIONS

[REDACTED]
[REDACTED]
[REDACTED]

The upgraded water treatment plant with odor control and softening will have the facilities and equipment to treat the Frontenac water supply up to a design rate of 1,050 gpm. With one filter out of service, the plant will still be able to treat water to meet needs of the system. There are three high service pumps and any two of the pumps are capable of meeting peak water needs.

The new elevated water storage tank will greatly improve the ability of the water utility to provide water demand even when wells or treatment plant are out of service. Additional water storage will cut down on the number of cycles for the well pumps and treatment plant operation.

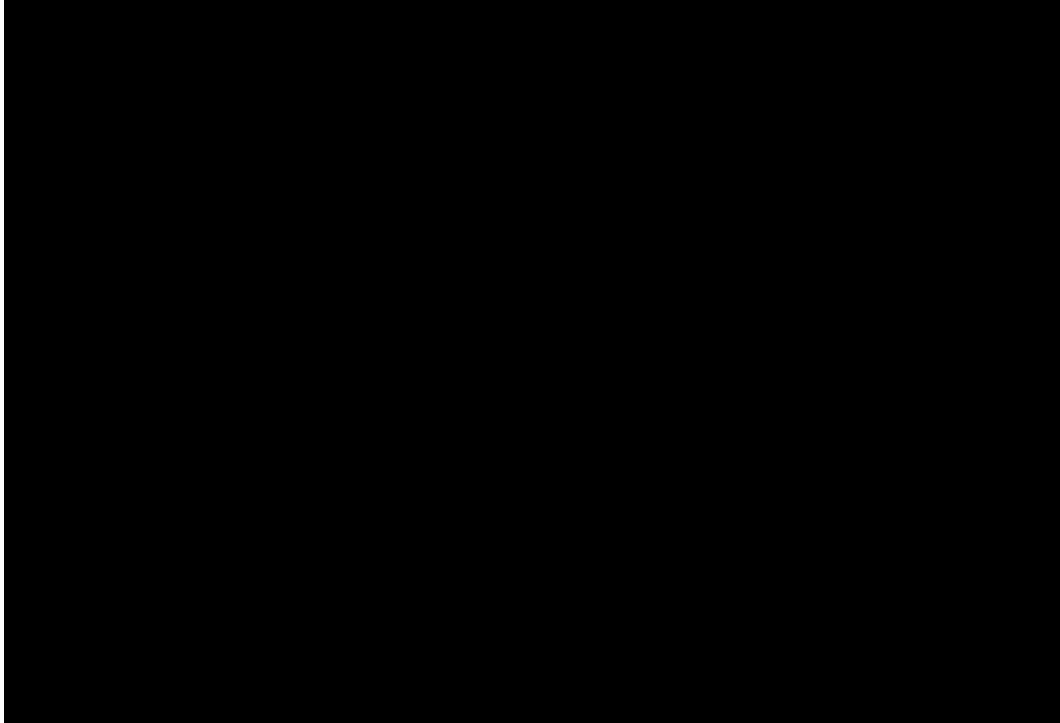
All of the proposed project improvements will greatly improve the sustainability of the water utility facilities.

Recommended Improvements



6.6.B Annual O & M Cost

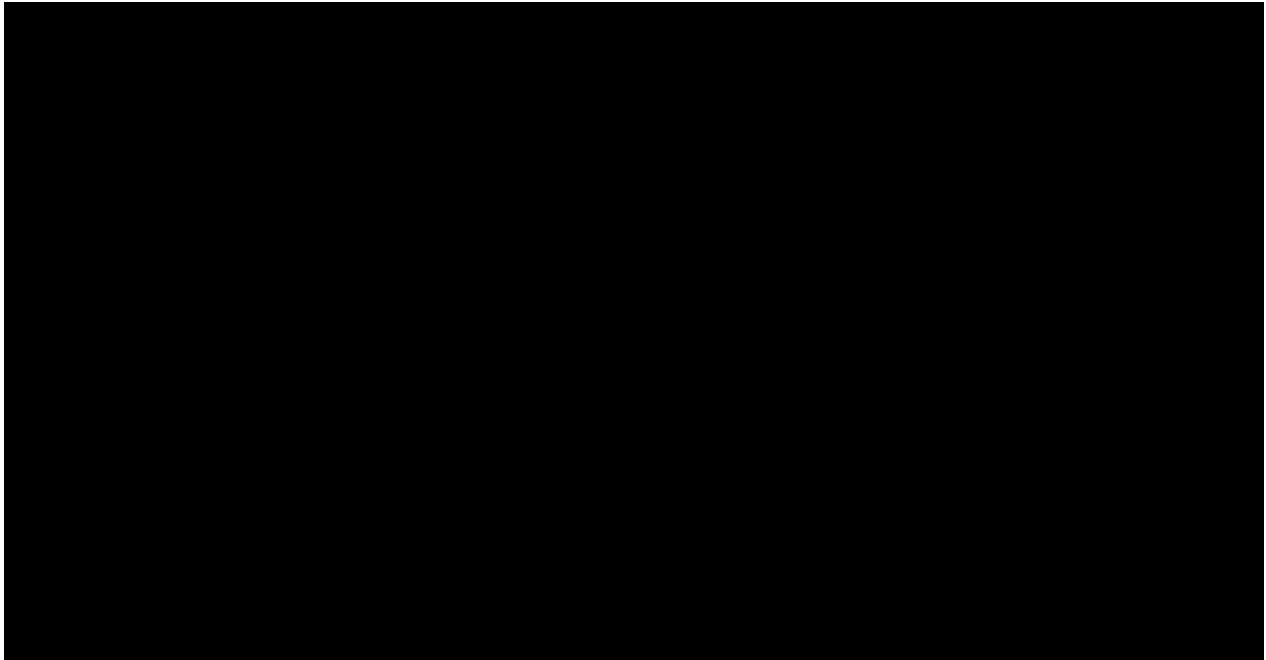
The estimated annual operating cost for the Frontenac Water Utility after the new well, water treatment plant improvements and new water storage tank projects recommended herein will be approximately the same cost as before the projects except for operation of the odor control unit, softening and the 15 year short lived asset reserve. Projected O&M cost are estimated as follows:



(The remainder of this page intentionally left blank)



The water expenditures in the Frontenac budget for 2018 are projected to be [REDACTED] Shown in Table VI-4 is the Water Expenditures Budget breakdown for 2018.

A large black rectangular box redacting the content of Table VI-4, which would show the Water Expenditures Budget breakdown for 2018.

As can be seen by the above table that capital outlay has been significantly increased over the 2016 budget in anticipation for water infrastructure projects, such as those proposed herein.

6.6.C Debt Payment

The City of Frontenac has several funding options to consider. With the recent combined radium exceedance violation, KDHE SRF may be able to provide principal loan forgiveness (PLF) on items that will help them come into compliance with the maximum contaminant level. The City is facing a significant financial burden in order to meet the water quality standard for combined radium by adding a treatment technology to their current system, plus the additional O&M costs associated to the treatment.

The following explains different funding methods available for the City to pay for projects listed herein.

6.6.C.1 Kansas Public Water Supply Loan Fund (KPWSLF)

The KPWSLF program is administered by the Kansas Department of Health and Environment. KPWSLF loans are made for water projects that are rated high enough to be placed on the funding portion of the KDHE Priority List.



Public participation, environmental reviews, cost analysis, certifications and other program requirements must be followed to obtain project funding.

The present interest rate on KPWSLF funds, as of June 2018 is 2.33%. The loan term is 20 years. Funds are available for City use once construction is ready to start. Cost prior to start of project construction including engineering reports, designs and legal services are eligible to be included in KPWSLF loans. Land and easement costs are not eligible expenses for KPWSLF. Repayment of the loan begins two years after the first draw on the loan or one year after construction is completed, whichever is sooner.

Principal Loan Forgiveness (PLF) is available for projects that will return a non-compliant water system to compliance in regards to a Maximum Contaminant Level requirement but excludes Total Organic Carbon violations.

6.6.C.2 United States Department of Agriculture – Rural Development (RD)

RD makes loans backed by the Federal government for water projects. The loans are generally for a 40 year period and the present interest rate around 3.125%. In order to qualify for Rural Development funding, the City must not be able to issue bonds on the bond market at a reasonable rate and the project must meet and comply with all RD requirements.

For an RD project to be accepted, an Electronic Preliminary Engineering Report (ePER) would need to be conducted and submitted by Kramer Consulting, LLC, as well as an online application, referred to as RD Apply.

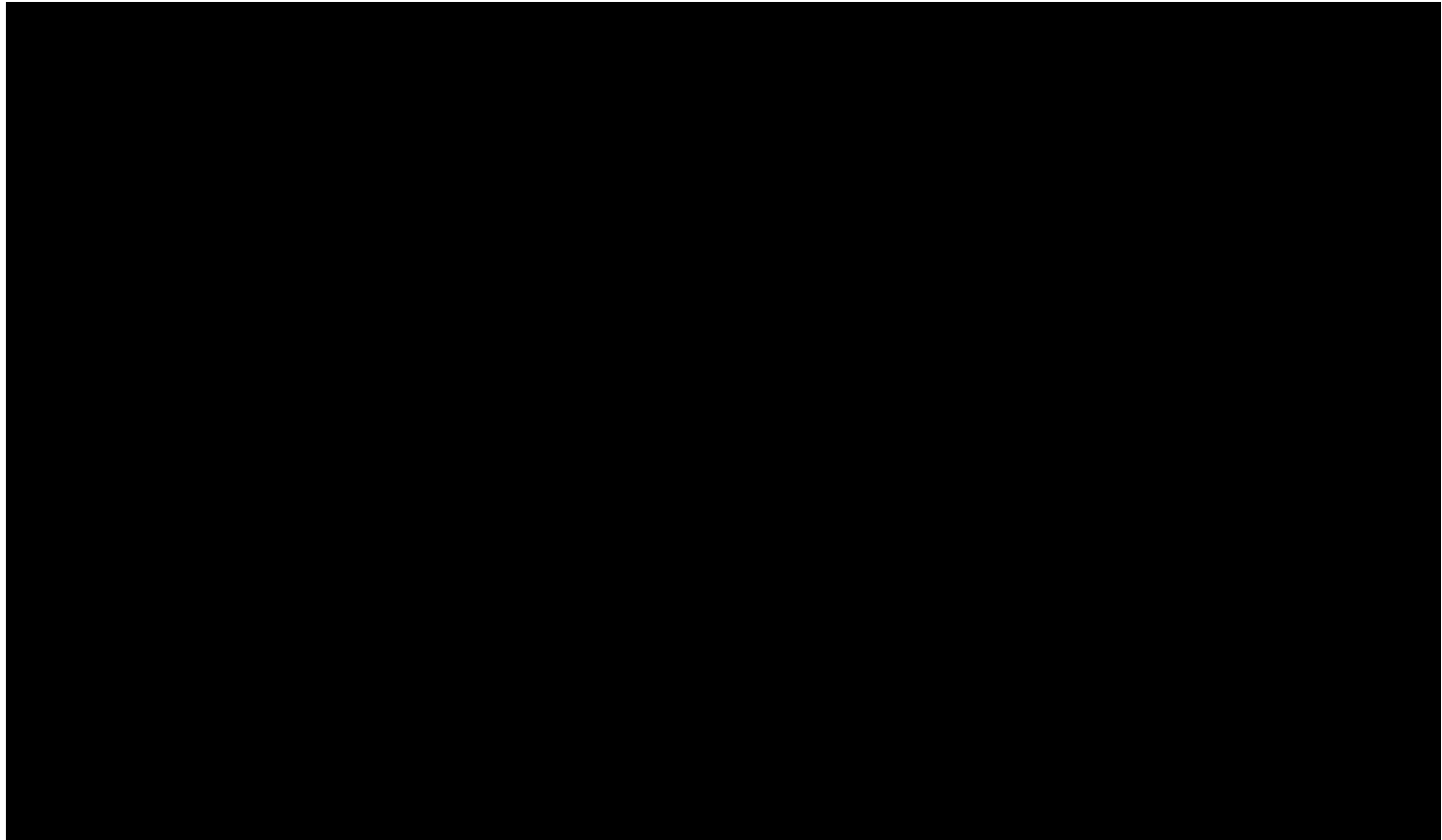
6.6.C.3 Water Infrastructure Finance and Innovation Act (WIFIA)

WIFIA is up to a 35 year loan that can provide 49% of project costs, where the remaining 51% is covered by KPWSLF or City funds. The interest rate is equal to or greater than the U.S. Treasury rate of similar maturity based on the date of closing. WIFIA is highly competitive, and the City must submit a Letter of Interest (LOI) in order to have the project reviewed. This funding program was new in 2017. There is a \$5,000,000 minimum project size based on the City of Frontenac's population size. The other major benefit of this funding program is that repayment can be deferred up to 5 years after substantial completion. If the City's LOI is accepted and they are invited to apply for funding, the fee for the application is \$25,000. There are also associated closing costs for the project.



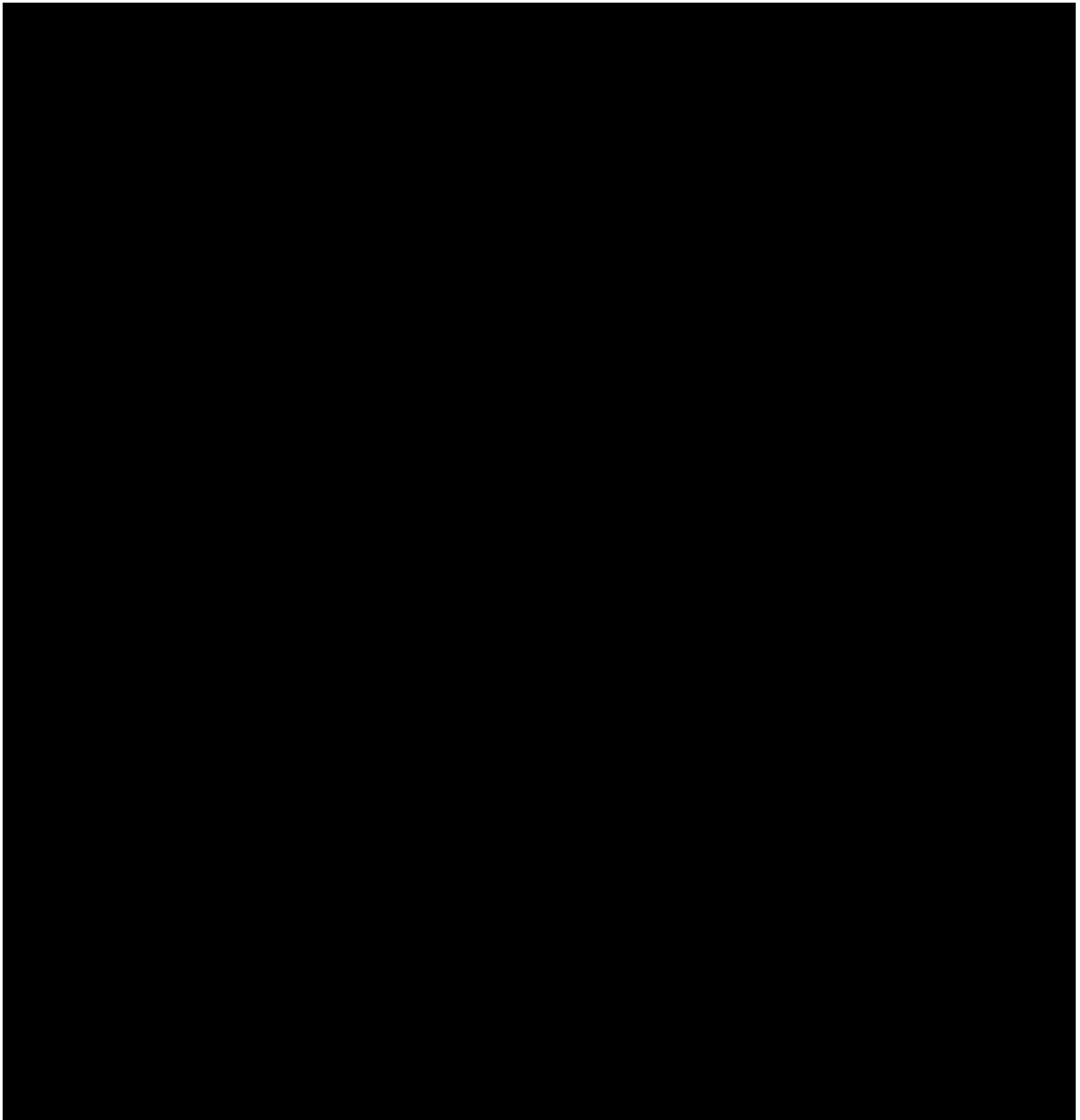
Funding options shown herein are for reference only. The City has determined that the WIFIA funding source with KDHE SRF is the most cost-effective and feasible funding method for the proposed projects herein, therefore would like to proceed with the WIFIA LOI.

The table below shows estimated debt payment.

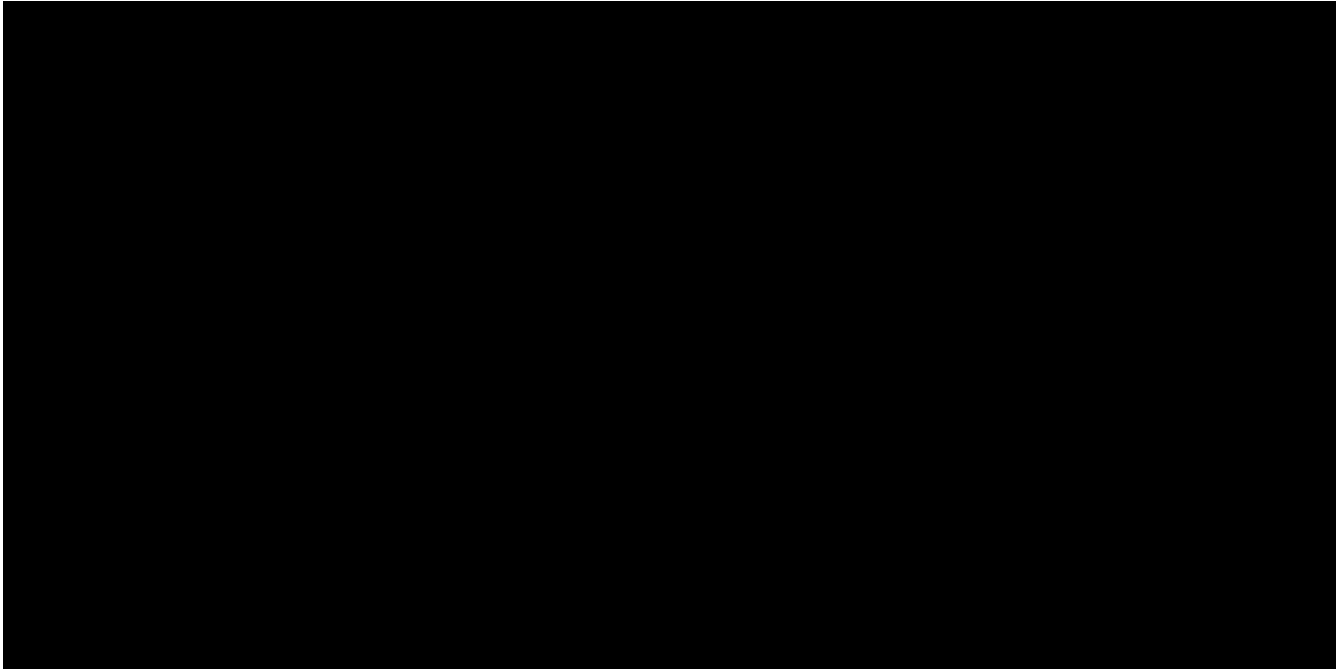


The following tables show possible user rates based on the actual number of gallons sold in year 2017 for each user category.

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Minimum charge and cost per 100 gallons after 2,000 gallons minimum is highly dependent on water sales, therefore the tables above are a rough estimate of what it may take in water sales to cover debt service and increased operation and maintenance.

The following table compares current water user charges in comparison with the increased user charges.

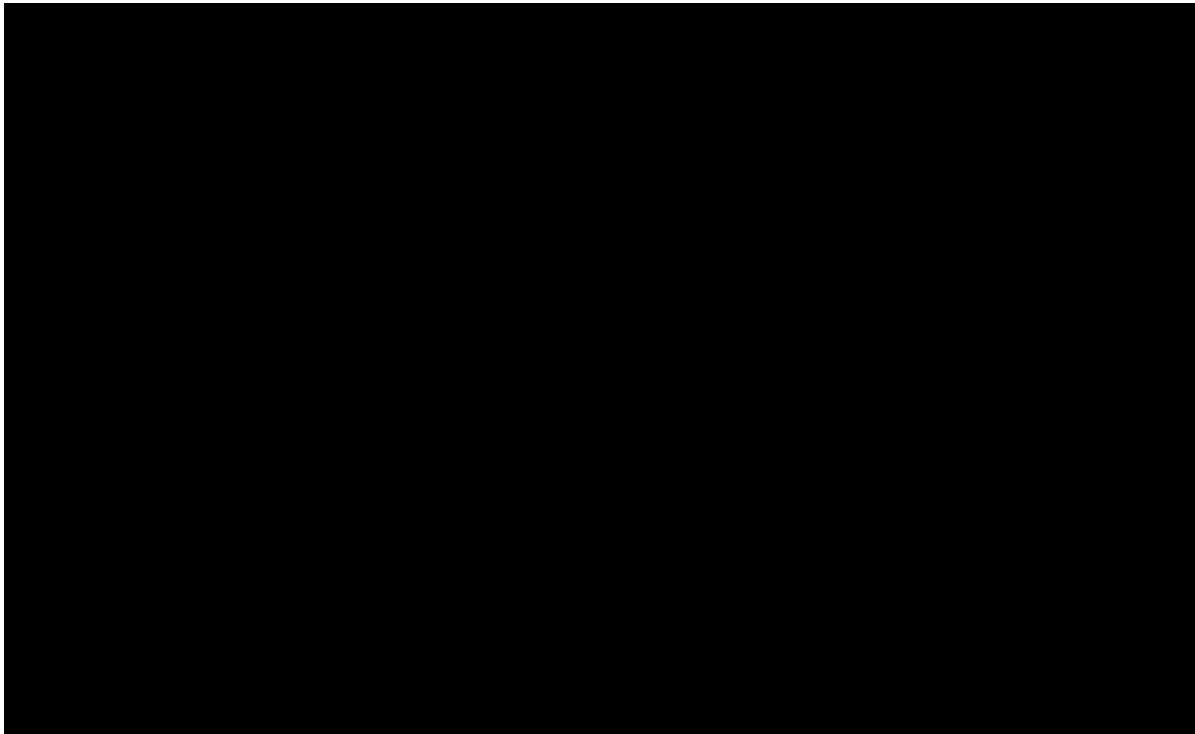
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The City has also conducted a preliminary analysis for a sales tax increase to generate additional revenue to help cover incurred project costs and lower the user charge rate. The tables above do not take into account for the increase in sales tax. Proposed 0.5% sales tax increase would generate approximately [REDACTED] and a 1.0% sales tax increase would generate approximately [REDACTED]. The combination of a sales tax increase and user charge increase would generate the amount of revenue needed in order to cover debt service. With the additional sales tax increase, the user rates shown in the above tables could be significantly decreased.

The following table shows the possibility of user charge rates in 2025 with the addition of a 0.5% tax increase estimated revenue.

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The approximate increase over the current 2021 user charge is only 7% to have a positive ending cash balance with the addition of the 0.5% sales tax increase estimated revenue.

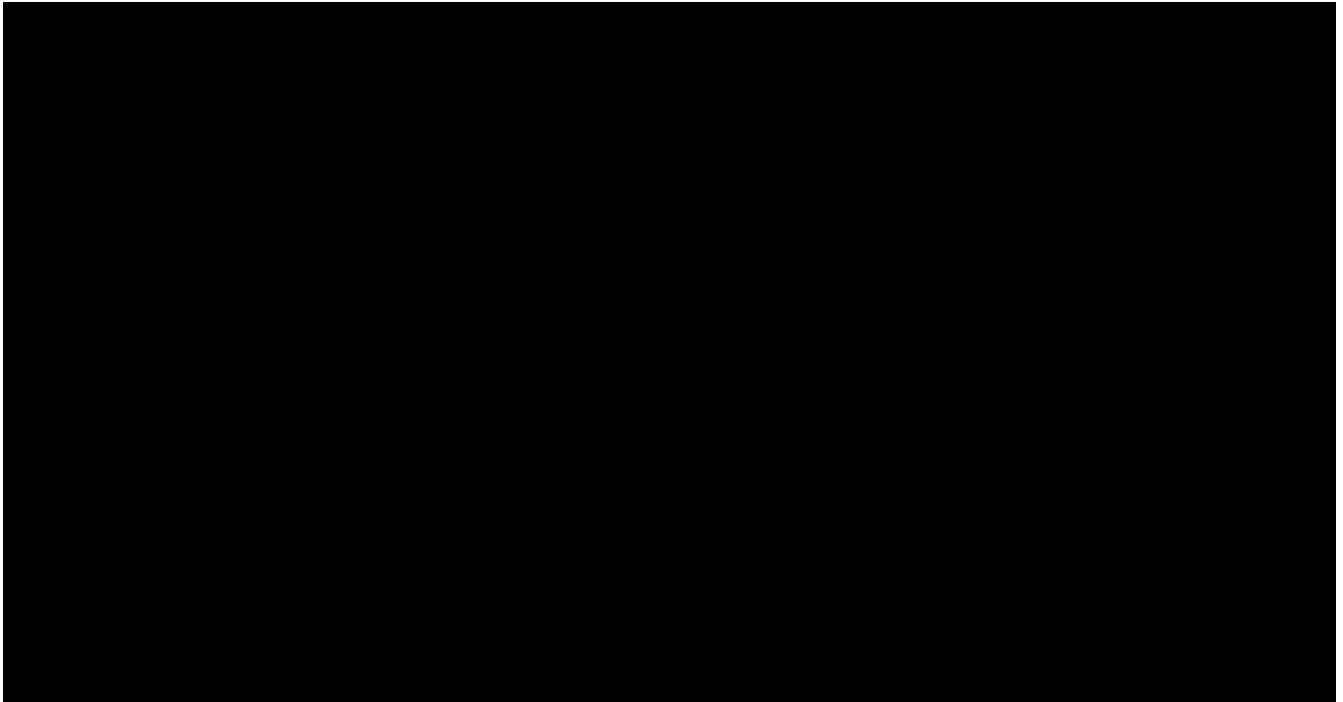
Additional revenue needed to cover additional operation and maintenance costs, as well as the debt service, is a decision made by the City of Frontenac's governing body, therefore the information herein is only scenario based.

WIFIA funding would allow the City to defer payments up to five years after substantial completion. Two of the General Obligation funds shown in Section 2 of this report would be paid off prior to payments on WIFIA. By deferring the payment to WIFIA during the 5 year deferment period, this would greatly reduce the hardship on the City and would also allow the City to complete this project in a timelier manner versus other funding options, due to being able to pay off the General Obligation bonds while gradually increasing user charges. This would eliminate the need for steep water user charge increases.

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6.7 SHORT LIVED ASSET RESERVE



Normal day to day small repairs and equipment replacement cost are included in Operation and Maintenance and not included in short lived asset reserve.

The short lived asset reserve account will be funded yearly from water utility revenues over expenses.

* * * * *



SECTION 7

CONCLUSIONS AND RECOMMENDATIONS

7.1 CONCLUSIONS

Frontenac water treatment plant is over 27 years old and in order to provide reliable service, several items of equipment need replaced and/or upgraded. Some of these items, such as the filter water influent distributor, are near structural failure which would cause a plant shut-down. Improvements and upgrades to the treatment plant are needed in order to keep the plant operating and meet water quality standards.

The City's well water is high in hydrogen sulfide (H₂S), combined radium, water hardness and sodium. The treatment facilities remove the H₂S and discharge it into the air as a gas. The H₂S gas is very odorous and the City receives several complaints about the gas, especially when it is blown north to the ball diamond and park area. Combined radium removal is necessary by lime softening to bring the City into compliance with the Radionuclides Rule which places a maximum contaminant level on combined radium. Lime softening also has other benefits to the water system, which includes reducing the hardness of water making it easier for soap to lather and less buildup on appliances. Concentration levels of sodium are high and should be monitored. Sodium can be harmful to humans which cannot be on a high sodium diet due to health related issues. Certain treatment technologies, such as ion exchange, were eliminated from the alternatives because it will increase the already high concentration of sodium.

[REDACTED]

The water distribution system is in need of improvements in subject areas as outlined in this report. With the installation of new water mains, valves, hydrants and appurtenances, the City will have an adequate water distribution system to serve users throughout and well beyond the design year without major improvements.

Water storage is provided by a 160,000 gallon clearwell at the treatment plant, as well as a 250,000 gallon and 75,000 gallon elevated water storage tanks on the distribution system. The 75,000 gallon elevated water storage tank needs to be rehabilitated; it is over 111 years old, in poor condition and failing. An additional 250,000 gallon elevated water storage tank is needed to increase water storage in case of water plant or power failure, and increase fire flow.



7.2 RECOMMENDATIONS

It is recommended that Frontenac improve their present water utility as covered in this report. Based on this study and project information, the recommended water utility improvements and project funding are as follows:

[REDACTED]

[REDACTED]
[REDACTED]

7.2.B Water Treatment

- 1) New filter water influent distributor, media replacement, backwash troughs and filter console
- 2) Plant control panel and controls to read water tower levels and operate wells and water plant
- 3) VFD's for all high service pumps and Wells
- 4) Replace chlorine feed system, deteriorated piping, valves, meters, exhaust fans, air louvers and plant heaters
- 5) New wastewater pumps
- 6) Air ducts to scrubber, blower and air scrubber for H₂S removal.
- 7) Lime Softening Equipment – Solids Contact Basin, lime silo, feeders and hopper unit, recarbonation basin equipment and chemical feed, piping, valving, electrical, chemical storage building, filter backwash basin, wastewater pumps and appurtenances.

7.2.C Water Distribution System

- 1) Water main replacement
- 2) Valves
- 3) Hydrants
- 4) Appurtenances

7.2.D Water Storage

- 1) Construct 250,000 gallon pedisphere water storage tank.
- 2) Rehabilitate the 75,000 gallon elevated water storage tank.



7.3 **FUNDING**

Proposed funding methods listed in Section 6 outlines typical funding options for scope of work generally discussed within this report.

The City has expressed intentions for funding the proposed projects herein with the Water Infrastructure Finance and Innovation Act (WIFIA) and the KDHE SRF Loan program, with the possibility for principal loan forgiveness up to 30% on items that will help them come into compliance with combined radium.

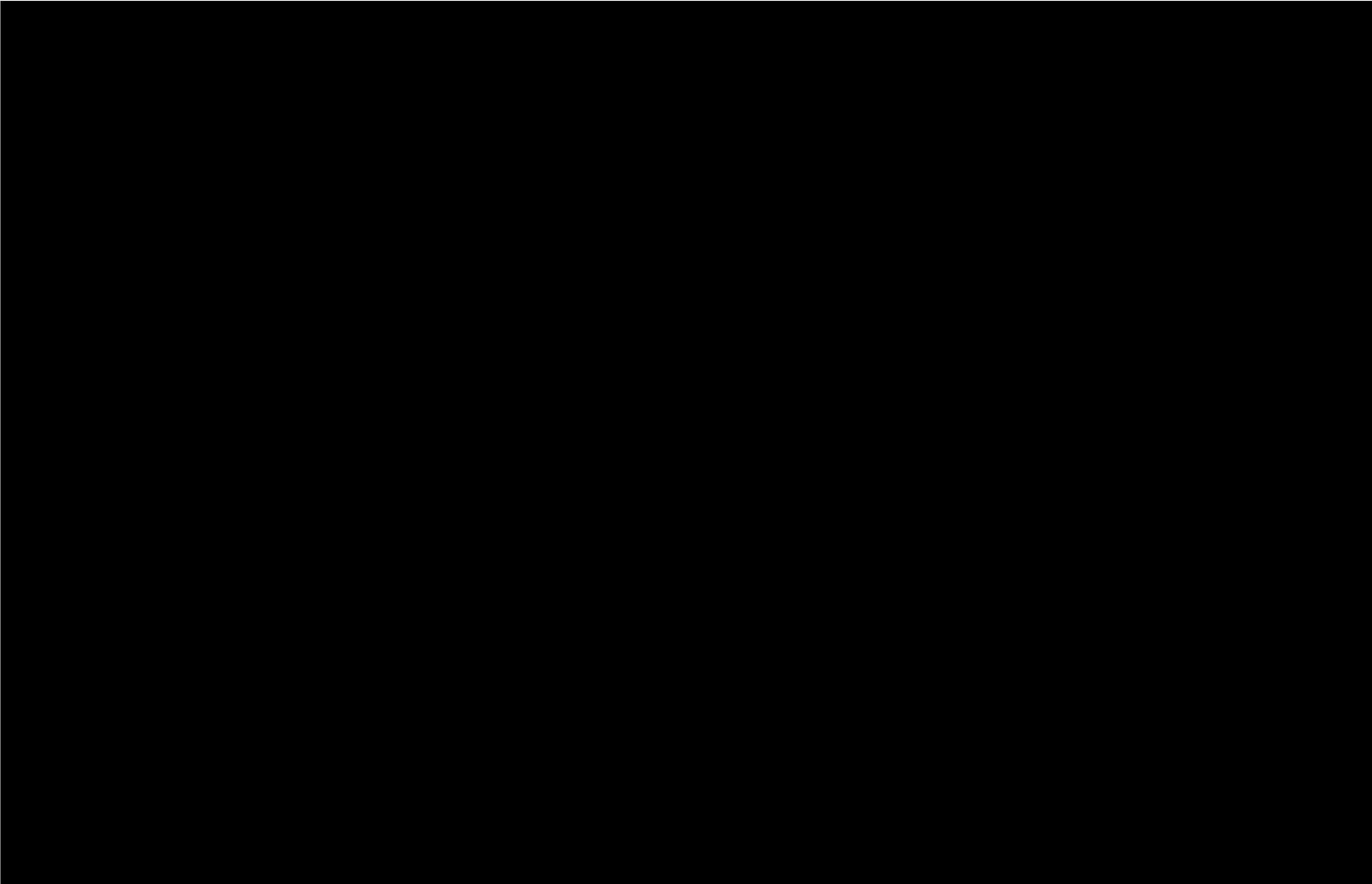
WIFIA, as discussed in previous sections, will greatly benefit the City by deferring payments on the loan up to five years after substantial completion in order to reduce the burden on the financial capability of the City. Two of the City's General Obligation bonds will pay off in 2020 and 2024, therefore decreasing the City's indebtedness prior to making the first WIFIA payment and will allow a gradual increase to user rates. WIFIA will allow the City to complete the project in a much timelier fashion than other funding sources.

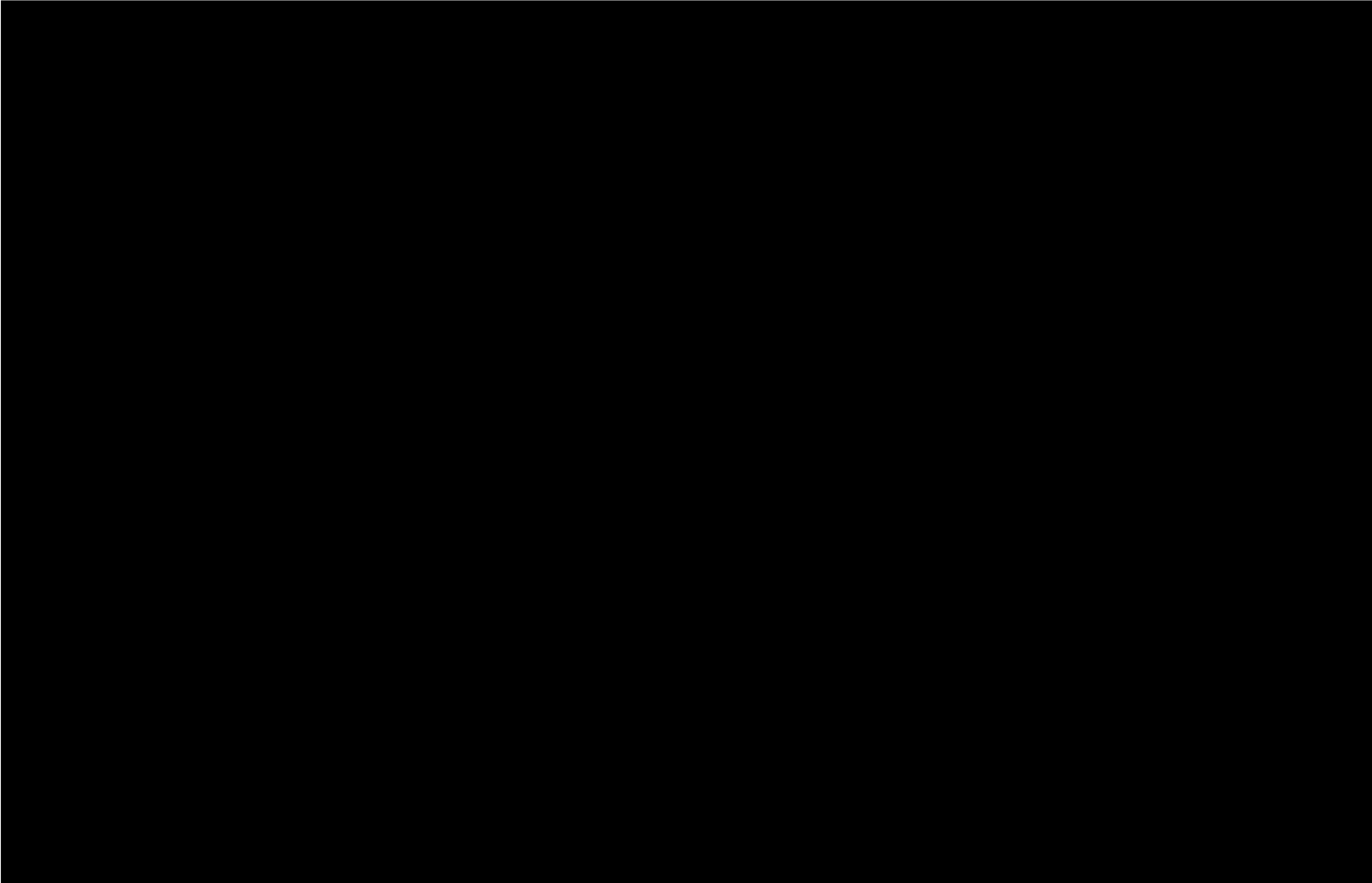
WIFIA does not have a fee to submit the Letter of Intent, however, WIFIA does have a \$25,000 application fee if the City is invited to submit the proposed project herein, as well as applicable closing costs, which should also be considered when determining a feasible funding method.

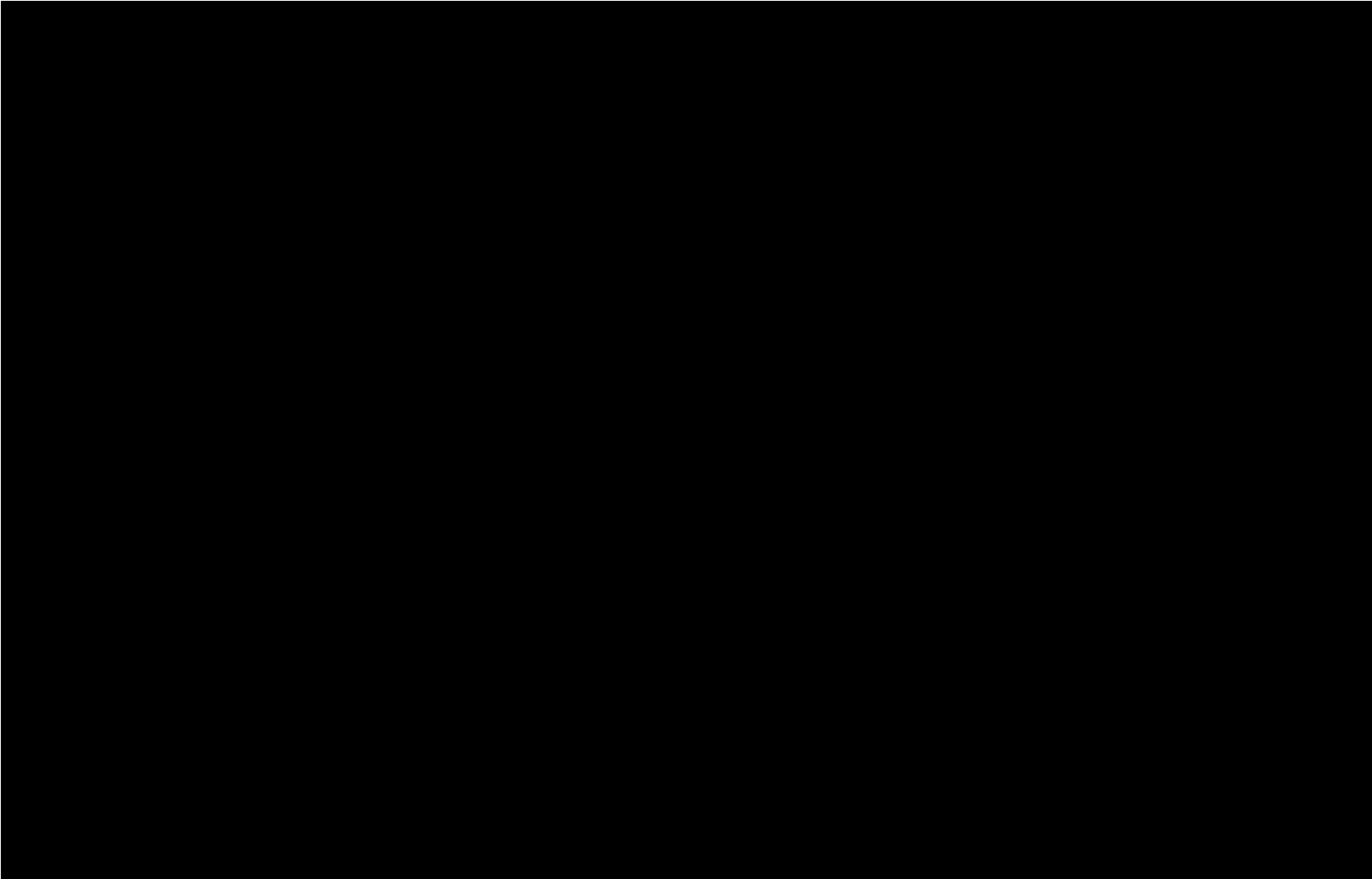
* * * * *

APPENDIX A

FIGURES I-1, I-2 and I-3







APPENDIX B

SIGNIFICANCE OF INORGANIC WATER ANALYSIS FOR HUMAN USAGE

DIVISION OF HEALTH AND ENVIRONMENTAL LABORATORIES
Department of Health and Environment

SIGNIFICANCE OF INORGANIC WATER ANALYSES FOR HUMAN USAGE

REPORTING UNITS: Most analytical results are reported in units of either in milligrams per liter (mg/L) which are equivalent to parts per million or micrograms per liter (ug/L) which are equivalent to parts per billion. The exceptions are pH which is reported in pH Units, Corrosivity which is reported as Langerlier's Index (LI), Turbidity which is reported in nephelometric turbidity units (NTU) and Specific Conductivity which is reported in micromhos per centimeter (umho/cm).

TOTAL HARDNESS: Calcium and magnesium are the principal minerals contributing to total hardness. Hard water has a tendency to develop scale deposits, especially when heated above 140° F. Soft water may be corrosive. A total hardness of 400 mg/L is considered as excessive in Kansas.

SODIUM: Because high sodium levels can adversely affect those persons on a restricted sodium diet, people need to be aware of the sodium level in their drinking water, especially if the sodium value is greater than 100 mg/L. Water softeners which are recharged with salt (sodium chloride) further increase the sodium level.

POTASSIUM: The concentration of potassium normally found in drinking water has no physiological or aesthetic effects on drinking water users.

ALKALINITY, pH AND LANGERLIER'S INDEX: The alkalinity of water is a measure of its capacity to neutralize acids. Bicarbonate and carbonate are the major contributors to alkalinity. The pH value of a solution indicates the intensity of the acidic or basic character of the solution. The pH scale extends from 0, very acidic, to 14, very alkaline, with 7 being neutral. The relationship of pH, calcium and alkalinity determines whether a water is corrosive or whether it will deposit calcium carbonate. Langerlier's Index (LI) is an indicator of the corrosivity of water. KDHE interprets a water as being highly aggressive if the LI is less than -2.0, moderately aggressive if between -2.0 and 0, and nonaggressive if greater than 0.

CHLORIDE: The suggested limit for chloride is 250 mg/L because some people can detect a salty taste when chloride exceeds 250 mg/L. Chloride has no physiological effect.

SULFATE: The suggested limit for sulfate is 250 mg/L because of the bitter taste and laxative effects of sulfate above that level. Sulfate can act as a laxative to sensitive persons not accustomed to high sulfate water.

NITRATE: The drinking water standard for nitrate, reported as nitrogen (N), is 10 mg/L. Excessive nitrate may result in infant cyanosis, also known as methemoglobinemia or "blue baby syndrome", in children less than one year of age. There are no significant health effects for older children or adults. Boiling water will not remove nitrate.

FLUORIDE: The maximum contaminant level (MCL) for fluoride is 4.0 mg/L with a suggested limit of 2.0 mg/L. A fluoride concentration of approximately 1.0 mg/L helps prevent dental caries. At concentrations below 0.7 mg/L, fluoride will not be of any benefit. At concentrations above 2.0 mg/L, fluoride may cause mottling of the teeth.

TURBIDITY: Turbidity in water is the suspended material which causes a beam of light to scatter. Turbidity can be significant aesthetically and physiologically because it can provide a support for bacteria. The limits for surface water is a maximum two-day average of 5 NTU and a maximum average of 1 NTU over a thirty-day period. No limits are established for ground water.

SPECIFIC CONDUCTANCE: Conductance is a numerical expression of the ability of water to conduct an electric current. Because the number which is expressed as micromhos per centimeter, depends on the concentration of the dissolved minerals, conductance indicates the degree of mineralization in water. A conductance greater than 1,500 umho/cm is considered excessive.

TOTAL DISSOLVED SOLIDS: TDS is a measure of the dissolved material in water. EPA suggests a TDS over 500 mg/L is objectionable because of the mineral taste and the possible physiological effects.

TOTAL PHOSPHORUS: Phosphate is a nutrient found in water. In raw surface water, phosphate may cause water treatment problems associated with aquatic plants and with coagulation. Phosphate is used occasionally in a effort to keep iron and manganese in solution.

SILICA: Silica has no physiological significance to humans, but can cause crusting deposits on well screens, pipes and water heaters. Concentrations above 50 mg/L may cause a cloudy appearance.

AMMONIA: Ammonia can occur naturally in water supplies, while some water treatment plants add ammonia to react with chlorine to form a combined chlorine residual to control formation of trihalomethanes. At concentrations normally found it has no health effect, but may cause unpleasant odors.

IRON AND MANGANESE: Iron and manganese are objectionable because of the bad taste associated with the water, the staining of plumbing fixtures and laundered clothes, and the probable deposition of the elements in the distribution system. They have no significance physiologically. The suggested limits for iron and manganese are 0.3 mg/L and 0.05 mg/L respectively.

HEAVY METALS: For physiological effects the present standards for heavy metals and cyanide are:

Arsenic	50.0 ug/L	Barium	2000.0 ug/L	Cadmium	5.0 ug/L	Nickel	100.0 ug/L
Chromium	100.0 ug/L	Lead	15.0 ug/L	Mercury	2.0 ug/L	Thallium	2.0 ug/L
Selenium	50.0 ug/L	Antimony	6.0 ug/L	Beryllium	4.0 ug/L	Cyanide	200.0 ug/L

The suggested limits for copper and zinc are 1.3 mg/L and 5.0 mg/L respectively. The presence of copper and zinc indicates a possible corrosion problem.

Should there be further questions, the telephone number of the KDHE Bureau that deals with water and the Laboratory are:

Bureau of Water
Environmental Chemistry Laboratory, Inorganic Section

(785) 296-5518
(785) 296-1657

APPENDIX C

ADDITIONAL KDHE TEST RESULTS

DIVISION OF HEALTH & ENVIRONMENTAL LABORATORIES
 Kansas Department of Health and Environment
 Forbes Building #740, Topeka, Kansas 66620-0001
 (785) 296-1620

RECEIVED

REPORT OF ANALYSIS

MAR 10 2004

INORGANIC CHEMISTRY

BUREAU OF WATER

Report To: Gary Cignetti, Water Supt.
 313 E. McKay, P.O. Box 1012

Lab Number: 430386WS
 I5500 City of Frontenac

Frontenac KS 66763-1012

Site ID: 00133115
 Account Code: PE

Collection Location: 207 N. Labette

Collector: Gary Cignetti
 Date/Time Collected: 02/24/04 09:00

Matrix: Water Collect Depth:
 Date/Time Received: 02/25/04 09:12

Sample Comments:

Parameter	Analytical Result	Units	Analysis Date	Analytical Method
Alkalinity as CaCO ₃	210	mg/L	02/25/04	SM 2320B
Aluminum	< 10	ug/L	03/01/04	EPA 200.8
Antimony	< 1.0	ug/L	03/01/04	EPA 200.8
Arsenic	< 1.0	ug/L	03/01/04	EPA 200.8
Barium	190	ug/L	03/01/04	EPA 200.8
Beryllium	< 1.0	ug/L	03/01/04	EPA 200.8
Cadmium	< 1.0	ug/L	03/01/04	EPA 200.8
Calcium	54	mg/L	02/26/04	EPA 200.7
Chloride	170	mg/L	02/25/04	EPA 300.0
Chromium	< 1.0	ug/L	03/01/04	EPA 200.8
Copper	5.7	ug/L	03/01/04	EPA 200.8
Corrosivity	0.23	LI	03/09/04	Langlier Idx
Fluoride	0.49	mg/L	02/25/04	EPA 300.0
Iron	0.012	mg/L	02/26/04	EPA 200.7
Lead	< 1.0	ug/L	03/01/04	EPA 200.8
Magnesium	24	mg/L	02/26/04	EPA 200.7
Manganese	1.4	ug/L	03/01/04	EPA 200.8
Mercury	< 0.50	ug/L	03/04/04	EPA 245.1
Nickel	1.6	ug/L	03/01/04	EPA 200.8
Nitrate (N)	< 0.10	mg/L	02/25/04	EPA 300.0
Potassium	5.3	mg/L	02/26/04	EPA 200.7
Selenium	1.6	ug/L	03/01/04	EPA 200.8
Silica	11	mg/L	02/26/04	EPA 200.7
Silver	< 1.0	ug/L	03/01/04	EPA 200.8
Sodium	110	mg/L	02/26/04	EPA 200.7
Specific Conductivity	930	umho/cm	02/25/04	SM 2510B
Sulfate	36	mg/L	02/25/04	EPA 300.0
Thallium	< 1.0	ug/L	03/01/04	EPA 200.8
Total Dissolved Solids	530	mg/L	03/09/04	USGS I751-8
Total Hardness	230	mg/L	03/09/04	SM 2340B
Total Phosphorus (P)	< 0.020	mg/L	03/08/04	EPA 365.1
Turbidity	< 0.15	* NTU	02/26/04	SM 2130B
Zinc	0.0085	mg/L	02/26/04	EPA 200.7
pH	7.8	pH unit	02/25/04	EPA 150.1

Analytical Comments:

Reporting Analyst: JAB
 Date Reported: 03/09/04

< - Not Detected at Indicated Level
 * - Holding Time Exceeded

Copies To: File
 BOW-PWSS

RHC 7/11/1

DIVISION OF HEALTH & ENVIRONMENTAL LABORATORIES
Kansas Department of Health and Environment
Forbes Building #740, Topeka, Kansas 66620-0001
(785) 296-1620

REPORT OF ANALYSIS

ORGANIC CHEMISTRY

Report To: DAN BRUNETTI
Address: PO BOX 1012, 313 E MCKAY
FRONTENAC, KS 66763-1012

Lab Number: 460039DF
Date Rec'd: 09/14/05
Report Date: 09/26/05

Site ID No.: DS1

Acct No: I5500 City of Frontenac
Site: 209 SUGAR CREEK RD
Collected By: GARY CIGNETTI

Sample Type: WATER Program Code: PD
No. Composited:
Depth: Date: 09/13/05 Time: 08:45

HALOACETIC ACIDS	CONCENTRATION (ug/L)	Analysis Date	EPA No.
Monochloroacetic Acid	< 2.0	09/23/05	.2
Dichloroacetic Acid	< 0.50	09/23/05	.2
Trichloroacetic Acid	< 0.50	09/23/05	.2
Monobromoacetic Acid	0.54	09/23/05	.2
Dibromoacetic Acid	1.8	09/23/05	.2
Total Haloacetic Acids (HAA5)	< 4.0	09/23/05	.2

Chemist: Jim Cook

< - Not Detected at Indicated Level

PC: RON CRAMER, BOW, CURTIS BUILDING, TOPEKA, KS, 66612
GREG TAYLOR, SEDO, 1500 W. 7TH ST., CHANUTE, KS 66720-9701

RECEIVED

SEP 29 2005

BUREAU OF WATER

DIVISION OF HEALTH & ENVIRONMENTAL LABORATORIES
Kansas Department of Health and Environment
Forbes Building #740, Topeka, Kansas 66620-0001
(785) 296-1620

REPORT OF ANALYSIS

ORGANIC CHEMISTRY

Report To: DAN BRUNETTI
Address: PO BOX 1012, 313 E MCKAY
FRONTENAC, KS 66763-1012

Lab Number: 460039TF
Date Rec'd: 09/14/05
Report Date: 09/25/05

Site ID No.: DS1
Acct No: I5500 City of Frontenac
Site: 209 SUGAR CREEK RD
Collected By: GARY CIGNETTI
Sample Type: WATER
Program Code: PD
No. Composited:
Depth: Date: 09/13/05 Time: 08:45

TRICHALOMETHANES	CONCENTRATION (ug/L)	Analysis Date	EPA No.
Trichloromethane (THM)	< 0.50	09/20/05	.2
Bromodichloromethane (THM)	0.95	09/20/05	.2
Dibromochloromethane (THM)	2.3	09/20/05	.2
Bromoform (THM)	4.3	09/20/05	.2
Total Trihalomethanes	7.6	09/20/05	.2

Chemist: Richard L. Pierce

< - Not Detected at Indicated Level

PC: RON CRAMER, BOW, CURTIS BUILDING, TOPEKA, KS, 66612
GREG TAYLOR, SEDO, 1500 W. 7TH ST., CHANUTE, KS 66720-9701

RECEIVED
SEP 27 2005
BUREAU OF WATER

DIVISION OF HEALTH & ENVIRONMENTAL LABORATORIES
Kansas Department of Health and Environment
Forbes Building #740, Topeka, Kansas 66620-0001
(785) 296-1620

~~City of Frontenac~~
City of Frontenac

REPORT OF ANALYSIS

RADIOCHEMISTRY

Report To: Kenny Redlon, Water Supt.
315 E. McKay, P.O. Box 1012
Frontenac KS 66763-1012

Lab Number: 100003PD
I5500 City of Frontenac

Site ID:
Account Code: PD

Collection Location: City of Frontenac; 207 N. Labett (2), Police Dept. (2)
Collector: K. Redlon (4)
Date/Time Collected: 07/10/00 08:30 Date/Time Received: 07/11/00 09:00
Sample Description: Public Drinking Water
Sample Comments: Collected 10/6/99, 1/11/00, 4/11/00; Received 10/7/99, 1/12/00, 4/12/00

Parameter	Analytical Result	Units	Error at 95% level	Analysis Date	Analytical Method
Gross-Alpha	7	pCi/L	2	07/17/00	AB-01 (EPA 900.0)
Ra-226	3.9	pCi/L	0.2	08/22/00	Ra-01 (EPA 903.1)
Ra-228	< 1.2	pCi/L		07/21/00	Ra-01 (EPA 904.0)

Analytical Comments: This is a composite result of four samples. This is a composite result four samples

Reporting Analyst: NDL Date Reported: 08/23/00 < - Not Detected at Indicated Level

The only radiological analyses currently required by the U.S. EPA National Primary Drinking Water Regulations are Gross Alpha analysis and, if the Gross Alpha analysis is over 5 pCi/L, Radium analysis. In special cases we may also perform a Uranium analysis.

The maximum contaminant levels, (MCL), are:

Gross Alpha 15 pCi/L
Combined Radium 226 and 228 5 pCi/L

If either of these levels are exceeded public notification is required and corrective actions must be taken by the water system to reduce the levels.

Uranium, while contributing to the Gross Alpha reading, does not have a separate drinking water standard yet. If Uranium is present in a sample, the result is subtracted from the Gross Alpha result before compliance with the standards is determined.

Additional questions concerning compliance with Public Drinking Water Standards may be directed to Jean Herrold, (913) 296-5518.

RECEIVED

AUG 24 2000

BUREAU OF WATER

Copies To: File
BOW - Jean Herrold
Rad. Control - D. Whitfill
SEDO

January 4, 2018

MONICA KELLOGG
FRONTENAC, CITY OF
313 E MCKAY
PO BOX 1012
FRONTENAC, KS 66763-1012

Dear Sir or Madam:

The compliance sample you submitted to the Kansas Health and Environmental Laboratories for Radiological Chemistry testing was sent to the Iowa State Hygienic Laboratory for analysis. The Kansas Drinking Water Certification Number for the Iowa State Hygienic Laboratory is E-10372.

Please see the enclosed report for your results.

Sincerely,



Christa M Obermeyer
KHEL Environment Section Chief

Enclosure



State Hygienic Laboratory

The University of Iowa

MYRON GUNSALUS
KANSAS HEALTH & ENVIRONMENTAL LABS
6810 SE DWIGHT ST
TOPEKA, KS 66620

Accession Number	591598
Date Sample Finalized	2017-12-21 12:23
Date Received	2017-11-17 10:30
Sample Source	Drinking Water
Project	
Date Collected	2017-11-13 11:00
Collection Site	tp001 402 e mckay
Collection Address	
Sample Description	FRONTENAC,
Client Reference	ks2003720
Collector	878160
Phone	lussimano b

Note: Upon arrival, sample met container and preservation requirements for the analysis requested. Please review carefully your sample results for additional analyte comments or method exceptions.

Kansas certification number is E-10372. Sample was received preserved from the client.

Results of Analyses

Gross Alpha (including Uranium), EPA 900.0

Units	pCi/L
Date Analyzed	2017-12-04 12:13
Analyst	AMC
Analysis Prep	Sample Check-In, RAD 7.0 V3

Analyzed In	Coralville
Date Verified	2017-12-05 10:33
Verifier	LMT

Analyte	Result	Uncertainty	Quant Limit
Gross Alpha including Uranium	6.6	1.5	2.0

Note: If the "Gross Alpha including Uranium" result is less than 15 pCi/L, for Iowa water supplies, the result will be considered the same as "Gross Alpha excluding Uranium". If the result is greater than 15 pCi/L then a "Gross Alpha excluding Uranium" test is also performed. The EPA has designated a maximum contaminant level (MCL) of 15 pCi/L for "Gross Alpha excluding Uranium" for public drinking water supplies. The MCL (is only applicable to compliance monitoring samples under the Safe Drinking Water Act (SDWA). Measurement uncertainty is reported as an expanded uncertainty with a coverage factor (k) of 2, correlating to a 95% level of confidence, unless otherwise noted.

Radium-226, EPA 903.0

Units	pCi/L
Date Analyzed	2017-12-21 10:50
Analyst	LMT
Analysis Prep	Sample Check-In, RAD 7.0 V3

Analyzed In	Coralville
Date Verified	2017-12-21 12:22
Verifier	DMM

Analyte	Result	Uncertainty	Quant Limit
Radium-226	4.0	0.4	0.5

Note: Measurement uncertainty is reported as an expanded uncertainty with a coverage factor (k) of 2, correlating to a 95% level of confidence, unless otherwise noted.



State Hygienic Laboratory

The University of Iowa

Accession Number | 591598

Radium 228, EPA 904.0

Units | pCi/L
Date Analyzed | 2017-12-07 14:29
Analyst | LMT
Analysis Prep | Sample Check-In, RAD 7.0 V3

Analyzed In | Coralville
Date Verified | 2017-12-08 07:23
Verifier | AMC

Analyte	Result	Uncertainty	Quant Limit
Radium-228	1.1	0.9	0.8

Note: Measurement uncertainty is reported as an expanded uncertainty with a coverage factor (k) of 2, correlating to a 95% level of confidence, unless otherwise noted.

Combined Radium 226 and 228, EPA 903.0/904.0

Units | pCi/L
Date Analyzed | 2017-12-21 10:50
Analyst | LMT

Analyzed In | Coralville
Date Verified | 2017-12-21 12:23
Verifier | DMM

Analyte	Result	Quant Limit	MCL
Combined Radiums	5.1	0.5	5.0

Note: The MCL (maximum contaminant level) is only applicable to compliance monitoring samples under the Safe Drinking Water Act (SDWA). Measurement uncertainty is reported as an expanded uncertainty with a coverage factor (k) of 2, correlating to a 95% level of confidence, unless otherwise noted.

Description of Units used within this report

pCi/L = PicoCuries per Liter

The result(s) of this report relate only to the items analyzed. This report shall not be reproduced except in full without the written approval of the laboratory.

Iowa Environmental Laboratory IDs are: Ankeny #397, Iowa City/Coralville #027, Lakeside #393.

If you have any questions, please call Client Services at 800/421-IOWA (4692) or 319/335-4500. Thank you.



Susan Mosier, MD, Secretary

Department of Health & Environment

Sam Brownback, Governor

January 4, 2018

MONICA KELLOGG
FRONTENAC, CITY OF
313 E MCKAY
PO BOX 1012
FRONTENAC, KS 66763-1012

Dear Sir or Madam:

The compliance sample you submitted to the Kansas Health and Environmental Laboratories for Radiological Chemistry testing was sent to the Iowa State Hygienic Laboratory for analysis. The Kansas Drinking Water Certification Number for the Iowa State Hygienic Laboratory is E-10372.

Please see the enclosed report for your results.

Sincerely,

Christa M Obermeyer
KHEL Environment Section Chief

Enclosure



State Hygienic Laboratory

The University of Iowa

MYRON GUNSALUS
KANSAS HEALTH & ENVIRONMENTAL LABS
6810 SE DWIGHT ST
TOPEKA, KS 66620

Accession Number	591598
Date Sample Finalized	2017-12-21 12:23
Date Received	2017-11-17 10:30
Sample Source	Drinking Water
Project	
Date Collected	2017-11-13 11:00
Collection Site	tp001 402 e mckay
Collection Address	
Sample Description	FRONTENAC,
Client Reference	ks2003720
Collector	878160
Phone	lussimano b

Note: Upon arrival, sample met container and preservation requirements for the analysis requested. Please review carefully your sample results for additional analyte comments or method exceptions.

Kansas certification number is E-10372. Sample was received preserved from the client.

Results of Analyses

Gross Alpha (including Uranium), EPA 900.0

Units	pCi/L
Date Analyzed	2017-12-04 12:13
Analyst	AMC
Analysis Prep	Sample Check-In, RAD 7.0 V3

Analyzed In	Coralville
Date Verified	2017-12-05 10:33
Verifier	LMT

Analyte	Result	Uncertainty	Quant Limit
Gross Alpha including Uranium	6.6	1.5	2.0

Note: If the "Gross Alpha including Uranium" result is less than 15 pCi/L, for Iowa water supplies, the result will be considered the same as "Gross Alpha excluding Uranium". If the result is greater than 15 pCi/L then a "Gross Alpha excluding Uranium" test is also performed. The EPA has designated a maximum contaminant level (MCL) of 15 pCi/L for "Gross Alpha excluding Uranium" for public drinking water supplies. The MCL (is only applicable to compliance monitoring samples under the Safe Drinking Water Act (SDWA). Measurement uncertainty is reported as an expanded uncertainty with a coverage factor (k) of 2, correlating to a 95% level of confidence, unless otherwise noted.

Radium-226, EPA 903.0

Units	pCi/L
Date Analyzed	2017-12-21 10:50
Analyst	LMT
Analysis Prep	Sample Check-In, RAD 7.0 V3

Analyzed In	Coralville
Date Verified	2017-12-21 12:22
Verifier	DMM

Analyte	Result	Uncertainty	Quant Limit
Radium-226	4.0	0.4	0.5

Note: Measurement uncertainty is reported as an expanded uncertainty with a coverage factor (k) of 2, correlating to a 95% level of confidence, unless otherwise noted.



State Hygienic Laboratory

The University of Iowa

Accession Number | 591598

Radium 228, EPA 904.0

Units | pCi/L
Date Analyzed | 2017-12-07 14:29
Analyst | LMT
Analysis Prep | Sample Check-In, RAD 7.0 V3

Analyzed In | Coralville
Date Verified | 2017-12-08 07:23
Verifier | AMC

Analyte	Result	Uncertainty	Quant Limit
Radium-228	1.1	0.9	0.8

Note: Measurement uncertainty is reported as an expanded uncertainty with a coverage factor (k) of 2, correlating to a 95% level of confidence, unless otherwise noted.

Combined Radium 226 and 228, EPA 903.0/904.0

Units | pCi/L
Date Analyzed | 2017-12-21 10:50
Analyst | LMT

Analyzed In | Coralville
Date Verified | 2017-12-21 12:23
Verifier | DMM

Analyte	Result	Quant Limit	MCL
Combined Radiums	5.1	0.5	5.0

Note: The MCL (maximum contaminant level) is only applicable to compliance monitoring samples under the Safe Drinking Water Act (SDWA). Measurement uncertainty is reported as an expanded uncertainty with a coverage factor (k) of 2, correlating to a 95% level of confidence, unless otherwise noted.

Description of Units used within this report

pCi/L = PicoCuries per Liter

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Iowa Environmental Laboratory IDs are: Ankeny #397, Iowa City/Coralville #027, Lakeside #393.

If you have any questions, please call Client Services at 800/421-IOWA (4692) or 319/335-4500. Thank you.

Testing Results for: CITY OF FRONTENAC

Regulated Contaminants	Collection Date	Highest Value	Range (low/high)	Unit	MCL	MCLG	Typical Source
BARIUM	1/25/2016	0.24	0.24	ppm	2	2	Discharge from metal refineries
FLUORIDE	1/25/2016	0.36	0.36	ppm	4	4	Natural deposits; Water additive which promotes strong teeth.
NITRATE	3/13/2017	0.23	0.23	ppm	10	10	Runoff from fertilizer use
SELENIUM	1/25/2016	2.4	2.4	ppb	50	50	Erosion of natural deposits

Disinfection Byproducts	Monitoring Period	Highest RAA	Range (low/high)	Unit	MCL	MCLG	Typical Source
TOTAL HALOACETIC ACIDS (HAAs)	2017	7	6.7	ppb	60	0	By-product of drinking water disinfection
THM	2017	27	27	ppb	80	0	By-product of drinking water chlorination

Lead and Copper	Monitoring Period	90 th Percentile	Range (low/high)	Unit	AL	Sites Over AL	Typical Source
COPPER, FREE	2014 - 2016	0.051	0.0082 - 0.067	ppm	1.3	0	Corrosion of household plumbing
LEAD	2014 - 2016	1.1	1.1 - 1.9	ppb	15	0	Corrosion of household plumbing

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. Your water system is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at <http://www.epa.gov/safewater/lead>.

Radiological Contaminants	Collection Date	Highest Value	Range (low/high)	Unit	MCL	MCLG	Typical Source
COMBINED RADIUM (-226 & -228)	8/7/2017	6.6	4.9 - 6.6	PC/L	5	0	Erosion of natural deposits

Secondary Contaminants-Non Health Based Contaminants-No Federal Maximum Contaminant Level (MCL) Established.	Collection Date	Highest Value	Range (low/high)	Unit	SMCL
ALKALINITY, TOTAL	1/25/2016	200	200	MG/L	300
CALCIUM	1/25/2016	70	70	MG/L	200
CHLORIDE	1/25/2016	260	260	MG/L	250
CONDUCTIVITY @ 25 C UMHO/CM	1/25/2016	1300	1300	UMHO/CM	1500
CORROSIVITY	1/25/2016	0.36	0.36	LANG	0
HARDNESS, TOTAL (AS CaCO ₃)	1/25/2016	310	310	MG/L	400
IRON	1/25/2016	0.012	0.012	MG/L	0.3
MAGNESIUM	1/25/2016	32	32	MG/L	150
MANGANESE	1/25/2016	0.0024	0.0024	MG/L	0.05
PH	1/25/2016	7.8	7.8	PH	8.5
POTASSIUM	1/25/2016	6.1	6.1	MG/L	100
SILICA	1/25/2016	11	11	MG/L	50
SODIUM	1/25/2016	150	150	MG/L	100
SULFATE	1/25/2016	43	43	MG/L	250
TDS	2/11/2013	590	590	MG/L	500
ZINC	1/25/2016	0.014	0.014	MG/L	5

Please Note: Because of sampling schedules, results may be older than 1 year.

During the 2017 calendar year, we had the below noted violation(s) of drinking water regulations.

Compliance Period	Analyte	Comments
7/1/2017 - 9/30/2017	COMBINED RADIUM (-226 & -228)	MCL, AVERAGE
10/1/2017 - 12/31/2017	COMBINED RADIUM (-226 & -228)	MCL, AVERAGE

Additional Required Health Effects Language:

Some people who drink water containing radium 226 or 228 in excess of the MCL over many years may have an increased risk of getting cancer.

2016

ANALYTICAL RESULTS

Submitter: Frontenac, City of

Report to: Jayme Mjelde
Frontenac, City of
313 E McKay
PO Box 1012
Frontenac, KS 66763-1012

Client ID: KS2003720
State ID: I5500

Collector: Brian Cussimano

Location Code: 133115
Location Desc: 402 E MCKAY

Lab ID: **480552**
Sample ID: **3336**
Description: **133115 TP001**

Matrix: Drinking Water
Date Collected: 1/25/2016 11:20
Date Received: 1/26/2016 10:41

Parameters	Results	Units	RDL	DF	Prep	By	Analyzed	By	Qual	RegLmt
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Sample Type RT
Sampling Point EP001

Metals by EPA 200.7

Analysis Desc: EPA 200.7

Preparation Method: EPA 180.1

Analytical Method: EPA 200.7

Calcium	70	mg/L	0.050	1	2/3/2016 16:25	VLH	2/5/2016 12:22	TLR		
Iron	0.012	mg/L	0.010	1	2/3/2016 16:25	VLH	2/5/2016 12:22	TLR		
Magnesium	32	mg/L	0.050	1	2/3/2016 16:25	VLH	2/5/2016 12:22	TLR		
Potassium	6.1	mg/L	0.050	1	2/3/2016 16:25	VLH	2/5/2016 12:22	TLR		
Silica	11	mg/L	0.11	1	2/3/2016 16:25	VLH	2/5/2016 12:22	TLR		
Sodium	150	mg/L	0.050	1	2/3/2016 16:25	VLH	2/5/2016 12:22	TLR		
Zinc	0.014	mg/L	0.0050	1	2/3/2016 16:25	VLH	2/5/2016 12:22	TLR		
Total Hardness as CaCO3	310	mg/L		1	2/3/2016 16:25	VLH	2/5/2016 12:22	TLR		

Metals by EPA 200.8

Analysis Desc: EPA 200.8

Preparation Method: EPA 180.1

Analytical Method: EPA 200.8

Aluminum	<10	ug/L	10	1	2/3/2016 16:25	VLH	3/25/2016 13:01	BLS		
Antimony	<1.0	ug/L	1.0	1	2/3/2016 16:25	VLH	3/25/2016 13:01	BLS		
Arsenic	<1.0	ug/L	1.0	1	2/3/2016 16:25	VLH	3/25/2016 13:01	BLS		
Barium	240	ug/L	1.0	1	2/3/2016 16:25	VLH	3/25/2016 13:01	BLS		
Beryllium	<1.0	ug/L	1.0	1	2/3/2016 16:25	VLH	3/25/2016 13:01	BLS		
Cadmium	<1.0	ug/L	1.0	1	2/3/2016 16:25	VLH	3/25/2016 13:01	BLS		
Chromium	<1.0	ug/L	1.0	1	2/3/2016 16:25	VLH	3/25/2016 13:01	BLS		
Copper	1.8	ug/L	1.0	1	2/3/2016 16:25	VLH	3/25/2016 13:01	BLS		
Lead	<1.0	ug/L	1.0	1	2/3/2016 16:25	VLH	3/25/2016 13:01	BLS		
Manganese	2.4	ug/L	1.0	1	2/3/2016 16:25	VLH	3/25/2016 13:01	BLS		
Nickel	<1.0	ug/L	1.0	1	2/3/2016 16:25	VLH	3/25/2016 13:01	BLS		
Selenium	2.4	ug/L	1.0	1	2/3/2016 16:25	VLH	3/25/2016 13:01	BLS		
Silver	<1.0	ug/L	1.0	1	2/3/2016 16:25	VLH	3/25/2016 13:01	BLS		
Thallium	<1.0	ug/L	1.0	1	2/3/2016 16:25	VLH	3/25/2016 13:01	BLS		

Analysis Desc: EPA 365.1

Preparation Method: EPA 365.1

Analytical Method: EPA 365.1

Total Phosphorus	<0.020	mg/L	0.020	1	2/1/2016 10:52	DJN	2/1/2016 10:52	DJN		
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Report Date: Thursday, March 31, 2016 3:12:10 PM

Report ID: 427272 - 3513186

Page 1 of 2

CERTIFICATE OF ANALYSIS

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without the written consent of KHEL.

ANALYTICAL RESULTS

Submitter: Frontenac, City of
Report to: Doug Sellars
Frontenac, City of
313 E McKay
PO Box 1012
Frontenac, KS 66763-1012

Client ID: KS2003720
State ID: I5500

Collector: Brian Cussimano

Location Code: 00133115
Location Desc: 402 E MCKAY

Lab ID: 334893
Sample ID: 8421
Description: 00133115 TP001

Matrix: Drinking Water
Date Collected: 5/18/2015 07:30
Date Received: 5/20/2015 11:57

Parameters	Results	Units	SDL	DF	Prep	By	Analyzed	By	Qual	RegLmt
------------	---------	-------	-----	----	------	----	----------	----	------	--------

Sample Type RT
Sampling Point EP001

Volatiles by EPA 524

Analysis Desc: EPA 524.2VOC

Preparation Method: EPA 524.2VOC

Analytical Method: EPA 524.2VOC

Vinyl Chloride	<0.50	ug/L	0.50	1	5/21/2015 23:54	MJA	5/21/2015 23:54	MJA	
1,1-Dichloroethylene	<0.50	ug/L	0.50	1	5/21/2015 23:54	MJA	5/21/2015 23:54	MJA	
Dichloromethane	<0.50	ug/L	0.50	1	5/21/2015 23:54	MJA	5/21/2015 23:54	MJA	
trans 1,2-Dichloroethylene	<0.50	ug/L	0.50	1	5/21/2015 23:54	MJA	5/21/2015 23:54	MJA	
cis 1,2-Dichloroethylene	<0.50	ug/L	0.50	1	5/21/2015 23:54	MJA	5/21/2015 23:54	MJA	
1,1,1-Trichloroethane	<0.50	ug/L	0.50	1	5/21/2015 23:54	MJA	5/21/2015 23:54	MJA	
Carbon tetrachloride	<0.50	ug/L	0.50	1	5/21/2015 23:54	MJA	5/21/2015 23:54	MJA	
Benzene	<0.50	ug/L	0.50	1	5/21/2015 23:54	MJA	5/21/2015 23:54	MJA	
1,2-Dichloroethane	<0.50	ug/L	0.50	1	5/21/2015 23:54	MJA	5/21/2015 23:54	MJA	
Trichloroethylene	<0.50	ug/L	0.50	1	5/21/2015 23:54	MJA	5/21/2015 23:54	MJA	
1,2-Dichloropropane	<0.50	ug/L	0.50	1	5/21/2015 23:54	MJA	5/21/2015 23:54	MJA	
Toluene	<0.50	ug/L	0.50	1	5/21/2015 23:54	MJA	5/21/2015 23:54	MJA	
1,1,2-Trichloroethane	<0.50	ug/L	0.50	1	5/21/2015 23:54	MJA	5/21/2015 23:54	MJA	
Tetrachloroethylene	<0.50	ug/L	0.50	1	5/21/2015 23:54	MJA	5/21/2015 23:54	MJA	
Chlorobenzene	<0.50	ug/L	0.50	1	5/21/2015 23:54	MJA	5/21/2015 23:54	MJA	
Ethylbenzene	<0.50	ug/L	0.50	1	5/21/2015 23:54	MJA	5/21/2015 23:54	MJA	
m,p-Xylene	<0.50	ug/L	0.50	1	5/21/2015 23:54	MJA	5/21/2015 23:54	MJA	
o-Xylene	<0.50	ug/L	0.50	1	5/21/2015 23:54	MJA	5/21/2015 23:54	MJA	
Xylene	<1.0	ug/L	1.0	1	5/21/2015 23:54	MJA	5/21/2015 23:54	MJA	
Styrene	<0.50	ug/L	0.50	1	5/21/2015 23:54	MJA	5/21/2015 23:54	MJA	
1,4-Dichlorobenzene	<0.50	ug/L	0.50	1	5/21/2015 23:54	MJA	5/21/2015 23:54	MJA	
1,2-Dichlorobenzene	<0.50	ug/L	0.50	1	5/21/2015 23:54	MJA	5/21/2015 23:54	MJA	
1,2,4-Trichlorobenzene	<0.50	ug/L	0.50	1	5/21/2015 23:54	MJA	5/21/2015 23:54	MJA	
1,2-Dibromoethane (EDB)	<0.040	ug/L	0.040	1	5/21/2015 23:54	MJA	5/21/2015 23:54	MJA	

Report Date: Friday, June 12, 2015 12:11:14 PM
Report ID: 323166 - 2298748

Page 1 of 1

CERTIFICATE OF ANALYSIS

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2016

ANALYTICAL RESULTS

Submitter: Frontenac, City of

Report to: Jayme Mjelde
Frontenac, City of
313 E McKay
PO Box 1012
Frontenac, KS 66763-1012

Client ID: KS2003720
State ID: I5500

Collector: Brian Cussimano

Location Code: 133115
Location Desc: 402 E MCKAY

Lab ID: **480552**
Sample ID: **3336**
Description: **133115 TP001**

Matrix: Drinking Water
Date Collected: 1/25/2016 11:20
Date Received: 1/26/2016 10:41

Parameters	Results	Units	RDL	DF	Prep	By	Analyzed	By	Qual	RegLmt
Analysis Desc: EPA 150.1, EPA120.1, SM2320B			Preparation Method: EPA 150.1, EPA120.1, SM2320B							
			Analytical Method: EPA 150.1, EPA120.1, SM2320B							
Alkalinity	200	mg/L	20	1	1/29/2016 11:46	MJA	1/29/2016 11:46	MJA		
Conductivity	1300	umho/cm	35	1	1/29/2016 11:46	MJA	1/29/2016 11:46	MJA		
pH	7.8	pH units	0.0	1	1/29/2016 11:46	MJA	1/29/2016 11:46	MJA		
Corrosivity	0.36	LSI		1	1/29/2016 11:46	MJA	1/29/2016 11:46	MJA		
Analysis Desc: EPA 180.1			Preparation Method: EPA 180.1							
			Analytical Method: EPA 180.1							
Turbidity	<0.15	NTU	0.15	1	1/29/2016 16:16	DJN	1/29/2016 16:16	DJN		
Analysis Desc: EPA 245.1			Preparation Method: EPA 245.1							
			Analytical Method: EPA 245.1							
Mercury	<0.50	ug/L	0.50	1	1/29/2016 14:44	TLR	1/29/2016 14:44	TLR		
Ion Chromatography										
Analysis Desc: EPA 300.0			Preparation Method: EPA 300.0							
			Analytical Method: EPA 300.0							
Chloride	260	mg/L	1.0	5	1/28/2016 02:52	VLH	1/28/2016 02:52	VLH		
Fluoride	0.36	mg/L	0.15	5	1/28/2016 02:52	VLH	1/28/2016 02:52	VLH		
Nitrate	<0.10	mg/L	0.10	5	1/28/2016 02:52	VLH	1/28/2016 02:52	VLH		
Sulfate	43	mg/L	0.50	5	1/28/2016 02:52	VLH	1/28/2016 02:52	VLH		

Report Date: Thursday, March 31, 2016 3:12:13 PM
Report ID: 427272 - 3513186

Page 2 of 2

CERTIFICATE OF ANALYSIS

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KANSAS HEALTH AND ENVIRONMENTAL LABORATORIES
Forbes Field, Bldg. 740, Topeka, Kansas 66620-0001

REPORT OF ANALYSIS

2013

INORGANIC CHEMISTRY

Report To: DAN BRUNETTI
PO BOX 1012
313 E MCKAY
FRONTENAC KS 66763-1012

Analysis Code: WS Lab Number: 592327
I5500 FRONTENAC, CITY OF
Site ID: 00133115
Account Code: PE

Collection Location: 402 E MCKAY
Collector: BRIAN CUSSIMANIO
Date/Time Collected: 02/11/13 13:20

Matrix: Water Collect Depth:
Date/Time Received: 02/13/13 08:54

Sample Comments:

Parameter	Analytical Result	Units	Analysis Date	Analytical Method
Alkalinity as CaCO ₃	205	mg/L	02/15/13	SM 2320B
Aluminum	< 10	ug/L	02/19/13	EPA 200.8
Antimony	< 1.0	ug/L	02/19/13	EPA 200.8
Arsenic	1.5	ug/L	02/19/13	EPA 200.8
Barium	180	ug/L	02/19/13	EPA 200.8
Beryllium	< 1.0	ug/L	02/19/13	EPA 200.8
Cadmium	< 1.0	ug/L	02/19/13	EPA 200.8
Calcium	61	mg/L	02/14/13	EPA 200.7
Chloride	200	mg/L	02/14/13	EPA 300.0
Chromium	1.3	ug/L	02/19/13	EPA 200.8
Copper	2.0	ug/L	02/19/13	EPA 200.8
Corrosivity	0.50	LI	03/01/13	Langlier Idx
Fluoride	0.54	mg/L	02/14/13	EPA 300.0
Iron	0.011	mg/L	02/14/13	EPA 200.7
Lead	< 1.0	ug/L	02/19/13	EPA 200.8
Magnesium	26	mg/L	02/14/13	EPA 200.7
Manganese	1.7	ug/L	02/19/13	EPA 200.8
Mercury	< 0.50	ug/L	02/20/13	EPA 245.1
Nickel	< 1.0	ug/L	02/19/13	EPA 200.8
Nitrate (N)	< 0.10	mg/L	02/14/13	EPA 300.0
Potassium	5.4	mg/L	02/14/13	EPA 200.7
Selenium	5.0	ug/L	02/19/13	EPA 200.8
Silica	11	mg/L	02/14/13	EPA 200.7
Silver	< 1.0	ug/L	02/19/13	EPA 200.8
Sodium	120	mg/L	02/14/13	EPA 200.7
Specific Conductivity	1100	μS/cm	02/15/13	SM 2510B
Sulfate	43	mg/L	02/14/13	EPA 300.0
Thallium	< 1.0	ug/L	02/19/13	EPA 200.8
Total Dissolved Solids	590	mg/L	03/01/13	USGS 1751-8
Total Hardness	260	mg/L	03/01/13	SM 2340B
Total Phosphorus (P)	< 0.020	mg/L	02/27/13	EPA 365.1
Turbidity	< 0.15	NTU	02/13/13	SM 2130B
Zinc	0.0086	mg/L	02/14/13	EPA 200.7
pH	8.0	pH unit	02/15/13	EPA 150.1

Reporting Analyst: JAB
Date Reported: 03/01/13
Copies To: File
BOW-PWSS

< - Not Detected at Indicated Level
* - Holding Time Exceeded



KANSAS HEALTH AND ENVIRONMENTAL LABORATORIES
Kansas Department of Health and Environment
Forbes Field, Bldg. 740, Topeka, Kansas 66620-0001



REPORT OF ANALYSIS

2010

INORGANIC CHEMISTRY

Report To: DAN BRUNETTI
PO BOX 1012
313 E MCKAY
FRONTENAC KS 66763-1012

Analysis Code: WS Lab Number: 541803

I5500 FRONTENAC, CITY OF
Site ID: 00133115
Account Code: PE

Collection Location: 207 N LABETTE
Collector: BRIAN CUSSIMANIO
Date/Time Collected: 02/02/10 11:20

Matrix: Water Collect Depth:
Date/Time Received: 02/03/10 08:45

Sample Comments:

Parameter	Analytical Result	Units	Analysis Date	Analytical Method
Alkalinity as CaCO ₃	219	mg/L	02/03/10	SM 2320B
Aluminum	< 10	ug/L	02/03/10	EPA 200.8
Antimony	< 1.0	ug/L	02/03/10	EPA 200.8
Arsenic	1.5	ug/L	02/03/10	EPA 200.8
Barium	170	ug/L	02/03/10	EPA 200.8
Beryllium	< 1.0	ug/L	02/03/10	EPA 200.8
Cadmium	< 1.0	ug/L	02/03/10	EPA 200.8
Calcium	61	mg/L	02/05/10	EPA 200.7
Chloride	220	mg/L	02/03/10	EPA 300.0
Chromium	2.8	ug/L	02/03/10	EPA 200.8
Copper	21	ug/L	02/03/10	EPA 200.8
Corrosivity	0.16	LI	02/16/10	Langlier Idx
Fluoride	0.56	mg/L	02/03/10	EPA 300.0
Iron	< 0.010	mg/L	02/05/10	EPA 200.7
Lead	< 1.0	ug/L	02/03/10	EPA 200.8
Magnesium	28	mg/L	02/05/10	EPA 200.7
Manganese	1.4	ug/L	02/03/10	EPA 200.8
Mercury	< 0.50	ug/L	02/11/10	EPA 245.1
Nickel	1.4	ug/L	02/03/10	EPA 200.8
Nitrate (N)	< 0.10	mg/L	02/03/10	EPA 300.0
Potassium	5.9	mg/L	02/05/10	EPA 200.7
Selenium	6.5	ug/L	02/03/10	EPA 200.8
Silica	11	mg/L	02/05/10	EPA 200.7
Silver	< 1.0	ug/L	02/03/10	EPA 200.8
Sodium	130	mg/L	02/05/10	EPA 200.7
Specific Conductivity	1200	µS/cm	02/03/10	SM 2510B
Sulfate	46	mg/L	02/03/10	EPA 300.0
Thallium	< 1.0	ug/L	02/03/10	EPA 200.8
Total Dissolved Solids	640	mg/L	02/16/10	USGS 1751-8
Total Hardness	270	mg/L	02/16/10	SM 2340B
Total Phosphorus (P)	< 0.020	mg/L	02/12/10	EPA 365.1
Turbidity	0.20	NTU	02/03/10	SM 2130B
Zinc	0.015	mg/L	02/05/10	EPA 200.7
pH	7.6	pH unit	02/03/10	EPA 150.1

Reporting Analyst: JAB
Date Reported: 02/17/10
Copies To: File
BOW-PWSS

< - Not Detected at Indicated Level
* - Holding Time Exceeded



DIVISION OF HEALTH & ENVIRONMENTAL LABORATORIES
Kansas Department of Health and Environment
Forbes Field, Bldg. 740, Topeka, Kansas 66620-0001



REPORT OF ANALYSIS

INORGANIC CHEMISTRY

Report To: DAN BRUNETTI
PO BOX 1012
313 E MCKAY
FRONTENAC KS 66763-1012

2007

Analysis Code: WS Lab Number: 486212

Collection Location: 207 N LABETTE
Collector: GARY CIGNETTI
Date/Time Collected: 02/13/07 14:30

I5500 FRONTENAC, CITY OF
Site ID: 00133115
Account Code: PE

Matrix: Water

Collect Depth:

Date/Time Received: 02/14/07 09:37

Sample Comments:

Parameter	Analytical Result	Units	Analysis Date	Analytical Method
Alkalinity as CaCO ₃	203			
Aluminum	12	mg/L	02/14/07	SM 2320B
Antimony	< 1.0	ug/L	02/14/07	EPA 200.8
Arsenic	1.6	ug/L	02/14/07	EPA 200.8
Barium	200	ug/L	02/14/07	EPA 200.8
Beryllium	< 1.0	ug/L	02/14/07	EPA 200.8
Cadmium	< 1.0	ug/L	02/14/07	EPA 200.8
Calcium	61	mg/L	02/14/07	EPA 200.8
Chloride	220	mg/L	02/26/07	EPA 200.7
Chromium	3.2	ug/L	02/17/07	EPA 300.0
Copper	16	ug/L	02/14/07	EPA 200.8
Corrosivity	0.20	LI	02/14/07	EPA 200.8
Fluoride	0.50	mg/L	03/01/07	Langlier Idx
Iron	0.22	mg/L	02/17/07	EPA 300.0
Lead	2.0	ug/L	02/26/07	EPA 200.7
Magnesium	28	mg/L	02/14/07	EPA 200.8
Manganese	2.8	ug/L	02/26/07	EPA 200.8
Mercury	< 0.50	ug/L	02/14/07	EPA 200.7
Nickel	90	ug/L	02/27/07	EPA 200.8
Nitrate (N)	< 0.10	mg/L	02/21/07	EPA 245.1
Potassium	5.5	mg/L	02/17/07	EPA 200.8
Selenium	6.7	mg/L	02/26/07	EPA 300.0
Silica	11	ug/L	02/14/07	EPA 200.7
Silver	< 1.0	mg/L	02/26/07	EPA 200.8
Sodium	120	ug/L	02/14/07	EPA 200.7
Specific Conductivity	1100	mg/L	02/26/07	EPA 200.8
Sulfate	30	umho/cm	02/14/07	EPA 200.7
Thallium	< 1.0	mg/L	02/17/07	SM 2510B
Total Dissolved Solids	590	ug/L	02/14/07	EPA 300.0
Total Hardness	270	mg/L	03/01/07	EPA 200.8
Total Phosphorus (P)	< 0.020	mg/L	03/01/07	USGS 1751-8
Turbidity	0.65	NTU	02/27/07	SM 2340B
Zinc	0.049	mg/L	02/14/07	EPA 365.1
pH	7.7	pH unit	02/26/07	SM 2130B
			02/14/07	EPA 200.7
				EPA 150.1

Reporting Analyst: JAB
Date Reported: 03/01/07
Copies To: File
BOW-PWSS

< - Not Detected at Indicated Level
* - Holding Time Exceeded

June 04, 2018

Mr. Gary Cignetti
City of Frontenac
313 East McKay
Frontenac, KS 66763

RE: Project: RAW WELL
Pace Project No.: 60269752

Dear Mr. Cignetti:

Enclosed are the analytical results for sample(s) received by the laboratory on May 05, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Sara Carson
sara.carson@pacelabs.com
(913)599-5665
PM Lab Management

Enclosures

cc: Brian Cussimano, City of Frontenac



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: RAW WELL

Pace Project No.: 60269752

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601

ANAB DOD-ELAP Rad Accreditation #: L2417

Alabama Certification #: 41590

Arizona Certification #: AZ0734

Arkansas Certification

California Certification #: 04222CA

Colorado Certification #: PA01547

Connecticut Certification #: PH-0694

Delaware Certification

EPA Region 4 DW Rad

Florida/TNI Certification #: E87683

Georgia Certification #: C040

Guam Certification

Hawaii Certification

Idaho Certification

Illinois Certification

Indiana Certification

Iowa Certification #: 391

Kansas/TNI Certification #: E-10358

Kentucky Certification #: KY90133

KY WW Permit #: KY0098221

KY WW Permit #: KY0000221

Louisiana DHH/TNI Certification #: LA180012

Louisiana DEQ/TNI Certification #: 4086

Maine Certification #: 2017020

Maryland Certification #: 308

Massachusetts Certification #: M-PA1457

Michigan/PADEP Certification #: 9991

Missouri Certification #: 235

Montana Certification #: Cert0082

Nebraska Certification #: NE-OS-29-14

Nevada Certification #: PA014572018-1

New Hampshire/TNI Certification #: 297617

New Jersey/TNI Certification #: PA051

New Mexico Certification #: PA01457

New York/TNI Certification #: 10888

North Carolina Certification #: 42706

North Dakota Certification #: R-190

Ohio EPA Rad Approval: #41249

Oregon/TNI Certification #: PA200002-010

Pennsylvania/TNI Certification #: 65-00282

Puerto Rico Certification #: PA01457

Rhode Island Certification #: 65-00282

South Dakota Certification

Tennessee Certification #: 02867

Texas/TNI Certification #: T104704188-17-3

Utah/TNI Certification #: PA014572017-9

USDA Soil Permit #: P330-17-00091

Vermont Dept. of Health: ID# VT-0282

Virgin Island/PADEP Certification

Virginia/VELAP Certification #: 9526

Washington Certification #: C868

West Virginia DEP Certification #: 143

West Virginia DHHR Certification #: 9964C

Wisconsin Approve List for Rad

Wyoming Certification #: 8TMS-L

Ormond Beach Certification IDs

8 East Tower Circle, Ormond Beach, FL 32174

Alabama Certification #: 41320

Connecticut Certification #: PH-0216

Delaware Certification: FL NELAC Reciprocity

Florida Certification #: E83079

Georgia Certification #: 955

Guam Certification: FL NELAC Reciprocity

Hawaii Certification: FL NELAC Reciprocity

Illinois Certification #: 200068

Indiana Certification: FL NELAC Reciprocity

Kansas Certification #: E-10383

Kentucky Certification #: 90050

Louisiana Certification #: FL NELAC Reciprocity

Louisiana Environmental Certificate #: 05007

Maryland Certification: #346

Michigan Certification #: 9911

Mississippi Certification: FL NELAC Reciprocity

Missouri Certification #: 236

Montana Certification #: Cert 0074

Nebraska Certification: NE-OS-28-14

Nevada Certification: FL NELAC Reciprocity

New Hampshire Certification #: 2958

New Jersey Certification #: FL022

New York Certification #: 11608

North Carolina Environmental Certificate #: 667

North Carolina Certification #: 12710

Oklahoma Certification #: D9947

Pennsylvania Certification #: 68-00547

Puerto Rico Certification #: FL01264

South Carolina Certification: #96042001

Tennessee Certification #: TN02974

Texas Certification: FL NELAC Reciprocity

US Virgin Islands Certification: FL NELAC Reciprocity

Virginia Environmental Certification #: 460165

Wyoming Certification: FL NELAC Reciprocity

West Virginia Certification #: 9962C

Wisconsin Certification #: 399079670

Wyoming (EPA Region 8): FL NELAC Reciprocity

REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: RAW WELL

Pace Project No.: 60269752

Southeast Kansas Certification IDs

808 West McKay, Frontenac, KS 66763

Arkansas Certification #: 17-016-0

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Oklahoma Certification #: 9935

Texas Certification #: T104704407

Utah Certification #: KS00021

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
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SAMPLE SUMMARY

Project: RAW WELL

Pace Project No.: 60269752

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60269752001	RAW WELL #1	Water	05/04/18 11:45	05/05/18 11:20
60269752002	RAW WELL #3	Water	05/04/18 12:05	05/05/18 11:20

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: RAW WELL

Pace Project No.: 60269752

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60269752001	RAW WELL #1	EPA 552.3	MMB	7	PASI-O
		EPA 200.7	LEC	11	PASI-O
		EPA 200.8	CRT	2	PASI-O
		EPA 524.2	QMC	8	PASI-O
		EPA 900.0	NJV	1	PASI-PA
		EPA 120.1	HWK	1	PASI-SE
		SM 4500-H+B	JWM	1	PASI-SE
		SM 2320B	AGS	1	PASI-O
		SM 2510B	MAJ	1	PASI-O
		SM 2540C	MAJ	1	PASI-O
		SM 4500-S2F	BMU	1	PASI-O
		SM 4500-S2H	BMU	1	PASI-O
		SM 2330B	AGS	1	PASI-O
		EPA 300.0	CMD	3	PASI-O
		EPA 353.2	JMD	2	PASI-O
		EPA 365.4	AEM	1	PASI-O
60269752002	RAW WELL #3	EPA 552.3	MMB	7	PASI-O
		EPA 200.7	LEC	11	PASI-O
		EPA 200.8	FDV	2	PASI-O
		EPA 524.2	QMC	8	PASI-O
		EPA 900.0	NJV	1	PASI-PA
		EPA 120.1	HWK	1	PASI-SE
		SM 4500-H+B	JWM	1	PASI-SE
		SM 2320B	AGS	1	PASI-O
		SM 2510B	MAJ	1	PASI-O
		SM 2540C	MAJ	1	PASI-O
		SM 4500-S2F	BMU	1	PASI-O
		SM 4500-S2H	BMU	1	PASI-O
		SM 2330B	AGS	1	PASI-O
		EPA 300.0	CMD	3	PASI-O
		EPA 353.2	JMD	2	PASI-O
		EPA 365.4	AEM	1	PASI-O

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
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ANALYTICAL RESULTS

Project: RAW WELL
Pace Project No.: 60269752

Sample: RAW WELL #1		Lab ID: 60269752001		Collected: 05/04/18 11:45		Received: 05/05/18 11:20		Matrix: Water	
Parameters		Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Field Data		Analytical Method:							
Field pH	7.21	Std. Units			1		05/04/18 11:45		
Field Temperature	23.1	deg C			1		05/04/18 11:45		
552.3 Haloacetic Acids		Analytical Method: EPA 552.3 Preparation Method: EPA 552.3							
Dibromoacetic Acid	ND	ug/L	1.0	1	05/10/18 00:24	05/14/18 17:25	631-64-1		
Dichloroacetic Acid	ND	ug/L	1.0	1	05/10/18 00:24	05/14/18 17:25	79-43-6		
Haloacetic Acids (Total)	ND	ug/L	1.0	1	05/10/18 00:24	05/14/18 17:25			
Monobromoacetic Acid	ND	ug/L	1.0	1	05/10/18 00:24	05/14/18 17:25	79-08-3		
Monochloroacetic Acid	ND	ug/L	1.0	1	05/10/18 00:24	05/14/18 17:25	79-11-8		
Trichloroacetic Acid	ND	ug/L	1.0	1	05/10/18 00:24	05/14/18 17:25	76-03-9		
Surrogates									
2,3-Dibromopropanoic Acid (S)	107	%	70-130	1	05/10/18 00:24	05/14/18 17:25	600-05-5		
200.7 MET ICP, Drinking Water		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Aluminum	ND	ug/L	100	1	05/08/18 03:16	05/10/18 13:49	7429-90-5		
Barium	200	ug/L	10.0	1	05/08/18 03:16	05/10/18 13:49	7440-39-3		
Calcium	69800	ug/L	500	1	05/08/18 03:16	05/10/18 13:49	7440-70-2		
Iron	65.0	ug/L	40.0	1	05/08/18 03:16	05/10/18 13:49	7439-89-6		
Magnesium	31000	ug/L	500	1	05/08/18 03:16	05/10/18 13:49	7439-95-4		
Manganese	9.5	ug/L	5.0	1	05/08/18 03:16	05/10/18 13:49	7439-96-5		
Potassium	6520	ug/L	1000	1	05/08/18 03:16	05/10/18 13:49	7440-09-7		
Silica	10600	ug/L	214	1	05/08/18 03:16	05/10/18 13:49	7631-86-9		
Sodium	147000	ug/L	1000	1	05/08/18 03:16	05/10/18 13:49	7440-23-5		
Tot Hardness asCaCO3 (SM 2340B	302000	ug/L	3300	1	05/08/18 03:16	05/10/18 13:49			
Zinc	ND	ug/L	20.0	1	05/08/18 03:16	05/10/18 13:49	7440-66-6		
200.8 MET ICPMS Drinking Water		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Arsenic	ND	ug/L	1.0	1	05/08/18 03:15	05/09/18 17:37	7440-38-2		
Selenium	ND	ug/L	1.0	1	05/08/18 03:15	05/09/18 17:37	7782-49-2		
524.2 THM		Analytical Method: EPA 524.2							
Bromodichloromethane	ND	ug/L	1.0	1		05/13/18 08:36	75-27-4		
Bromoform	ND	ug/L	1.0	1		05/13/18 08:36	75-25-2		
Chloroform	ND	ug/L	0.50	1		05/13/18 08:36	67-66-3		
Dibromochloromethane	ND	ug/L	1.0	1		05/13/18 08:36	124-48-1		
Total Trihalomethanes (Calc.)	ND	ug/L	1.0	1		05/13/18 08:36			
Surrogates									
4-Bromofluorobenzene (S)	100	%	70-130	1		05/13/18 08:36	460-00-4		
1,2-Dichloroethane-d4 (S)	103	%	70-130	1		05/13/18 08:36	17060-07-0		
Toluene-d8 (S)	102	%	70-130	1		05/13/18 08:36	2037-26-5		
Field Specific Conductance		Analytical Method: EPA 120.1							
Specific Conductance	1250	umhos/cm	1.0	1		05/04/18 11:45			
Field pH, Electrometric		Analytical Method: SM 4500-H+B							
pH	7.2	Std. Units	0.10	1		05/04/18 11:45			

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
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ANALYTICAL RESULTS

Project: RAW WELL
Pace Project No.: 60269752

Sample: RAW WELL #1		Lab ID: 60269752001		Collected: 05/04/18 11:45		Received: 05/05/18 11:20		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	273	mg/L	5.0	1		05/16/18 17:05			
2510B Specific Conductance		Analytical Method: SM 2510B							
Specific Conductance @ 25C	1270	umhos/cm	2.0	1		05/11/18 10:07			
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	554	mg/L	10.0	1		05/09/18 12:42			
4500S2F Sulfide		Analytical Method: SM 4500-S2F							
Sulfide	4.6	mg/L	0.10	1		05/08/18 14:05	18496-25-8	N2	
4500S2H Hydrogen Sulfide		Analytical Method: SM 4500-S2H							
Un-ionized Hydrogen Sulfide	1.6	mg/L	0.10	1		05/08/18 14:05		N2	
Langelier Index		Analytical Method: SM 2330B							
Langelier Index	-0.03			1		05/18/18 11:12	50-00-0		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	230	mg/L	25.0	5		05/10/18 09:59	16887-00-6		
Fluoride	0.52	mg/L	0.10	2		05/10/18 03:32	16984-48-8		
Sulfate	34.9	mg/L	10.0	2		05/10/18 03:32	14808-79-8		
353.2 Nitrogen, NO2/NO3 unpres		Analytical Method: EPA 353.2							
Nitrogen, Nitrate	ND	mg/L	0.050	1		05/05/18 12:20	14797-55-8		
Nitrogen, Nitrite	ND	mg/L	0.050	1		05/05/18 12:20	14797-65-0		
365.4 Phosphorus, Total DW		Analytical Method: EPA 365.4 Preparation Method: EPA 365.4							
Phosphorus, Total (as P)	ND	mg/L	0.10	1	05/10/18 09:14	05/14/18 13:56	7723-14-0	N2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: RAW WELL

Pace Project No.: 60269752

Sample: RAW WELL #3		Lab ID: 60269752002		Collected: 05/04/18 12:05		Received: 05/05/18 11:20		Matrix: Water	
Parameters		Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Field Data		Analytical Method:							
Field pH	7.33	Std. Units			1		05/04/18 12:05		
Field Temperature	23.0	deg C			1		05/04/18 12:05		
552.3 Haloacetic Acids		Analytical Method: EPA 552.3 Preparation Method: EPA 552.3							
Dibromoacetic Acid	ND	ug/L	1.0	1	05/10/18 00:24	05/14/18 17:45	631-64-1		
Dichloroacetic Acid	ND	ug/L	1.0	1	05/10/18 00:24	05/14/18 17:45	79-43-6		
Haloacetic Acids (Total)	ND	ug/L	1.0	1	05/10/18 00:24	05/14/18 17:45			
Monobromoacetic Acid	ND	ug/L	1.0	1	05/10/18 00:24	05/14/18 17:45	79-08-3		
Monochloroacetic Acid	ND	ug/L	1.0	1	05/10/18 00:24	05/14/18 17:45	79-11-8		
Trichloroacetic Acid	ND	ug/L	1.0	1	05/10/18 00:24	05/14/18 17:45	76-03-9		
Surrogates									
2,3-Dibromopropanoic Acid (S)	90	%	70-130	1	05/10/18 00:24	05/14/18 17:45	600-05-5		
200.7 MET ICP, Drinking Water		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Aluminum	ND	ug/L	100	1	05/08/18 03:16	05/10/18 13:52	7429-90-5		
Barium	274	ug/L	10.0	1	05/08/18 03:16	05/10/18 13:52	7440-39-3		
Calcium	79300	ug/L	500	1	05/08/18 03:16	05/10/18 13:52	7440-70-2		
Iron	533	ug/L	40.0	1	05/08/18 03:16	05/10/18 13:52	7439-89-6		
Magnesium	35400	ug/L	500	1	05/08/18 03:16	05/10/18 13:52	7439-95-4		
Manganese	8.7	ug/L	5.0	1	05/08/18 03:16	05/10/18 13:52	7439-96-5		
Potassium	6880	ug/L	1000	1	05/08/18 03:16	05/10/18 13:52	7440-09-7		
Silica	10700	ug/L	214	1	05/08/18 03:16	05/10/18 13:52	7631-86-9		
Sodium	170000	ug/L	1000	1	05/08/18 03:16	05/10/18 13:52	7440-23-5		
Tot Hardness asCaCO3 (SM 2340B	344000	ug/L	3300	1	05/08/18 03:16	05/10/18 13:52			
Zinc	ND	ug/L	20.0	1	05/08/18 03:16	05/10/18 13:52	7440-66-6		
200.8 MET ICPMS Drinking Water		Analytical Method: EPA 200.8							
Arsenic	ND	ug/L	1.0	1		05/09/18 14:47	7440-38-2		
Selenium	ND	ug/L	1.0	1		05/09/18 14:47	7782-49-2		
524.2 THM		Analytical Method: EPA 524.2							
Bromodichloromethane	ND	ug/L	1.0	1		05/13/18 08:59	75-27-4		
Bromoform	ND	ug/L	1.0	1		05/13/18 08:59	75-25-2		
Chloroform	ND	ug/L	0.50	1		05/13/18 08:59	67-66-3		
Dibromochloromethane	ND	ug/L	1.0	1		05/13/18 08:59	124-48-1		
Total Trihalomethanes (Calc.)	ND	ug/L	1.0	1		05/13/18 08:59			
Surrogates									
4-Bromofluorobenzene (S)	101	%	70-130	1		05/13/18 08:59	460-00-4		
1,2-Dichloroethane-d4 (S)	103	%	70-130	1		05/13/18 08:59	17060-07-0		
Toluene-d8 (S)	101	%	70-130	1		05/13/18 08:59	2037-26-5		
Field Specific Conductance		Analytical Method: EPA 120.1							
Specific Conductance	1390	umhos/cm	1.0	1		05/04/18 12:05			
Field pH, Electrometric		Analytical Method: SM 4500-H+B							
pH	7.3	Std. Units	0.10	1		05/04/18 12:05			

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: RAW WELL
Pace Project No.: 60269752

Sample: RAW WELL #3		Lab ID: 60269752002		Collected: 05/04/18 12:05		Received: 05/05/18 11:20		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	265	mg/L	5.0	1		05/16/18 17:10			
2510B Specific Conductance		Analytical Method: SM 2510B							
Specific Conductance @ 25C	1510	umhos/cm	2.0	1		05/11/18 10:08			
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	672	mg/L	10.0	1		05/09/18 12:42			
4500S2F Sulfide		Analytical Method: SM 4500-S2F							
Sulfide	4.4	mg/L	0.10	1		05/08/18 14:05	18496-25-8	N2	
4500S2H Hydrogen Sulfide		Analytical Method: SM 4500-S2H							
Un-ionized Hydrogen Sulfide	1.3	mg/L	0.10	1		05/08/18 14:05		N2	
Langelier Index		Analytical Method: SM 2330B							
Langelier Index	0.12			1		05/18/18 11:12	50-00-0		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	303	mg/L	25.0	5		05/10/18 10:22	16887-00-6		
Fluoride	0.46	mg/L	0.10	2		05/10/18 03:56	16984-48-8		
Sulfate	35.8	mg/L	10.0	2		05/10/18 03:56	14808-79-8		
353.2 Nitrogen, NO2/NO3 unpres		Analytical Method: EPA 353.2							
Nitrogen, Nitrate	ND	mg/L	0.050	1		05/05/18 12:22	14797-55-8		
Nitrogen, Nitrite	ND	mg/L	0.050	1		05/05/18 12:22	14797-65-0		
365.4 Phosphorus, Total DW		Analytical Method: EPA 365.4 Preparation Method: EPA 365.4							
Phosphorus, Total (as P)	ND	mg/L	0.10	1	05/10/18 09:14	05/14/18 13:58	7723-14-0	N2	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: RAW WELL

Pace Project No.: 60269752

QC Batch: 445623

Analysis Method: EPA 200.8

QC Batch Method: EPA 200.8

Analysis Description: 200.8 MET No Prep Drinking Water

Associated Lab Samples: 60269752002

METHOD BLANK: 2416694

Matrix: Water

Associated Lab Samples: 60269752002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	ug/L	ND	1.0	05/08/18 12:17	
Selenium	ug/L	ND	1.0	05/09/18 14:27	

LABORATORY CONTROL SAMPLE: 2416695

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	50	49.2	98	85-115	
Selenium	ug/L	50	50.4	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2416696 2416697

Parameter	Units	35381823001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	<0.00050	50	50	46.2	48.6	92	97	70-130	5	20	
Selenium	ug/L	0.00055J	50	50	53.5	54.4	106	108	70-130	2	20	

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QUALITY CONTROL DATA

Project: RAW WELL

Pace Project No.: 60269752

QC Batch: 445568

Analysis Method: EPA 200.7

QC Batch Method: EPA 200.7

Analysis Description: 200.7 MET Drinking Water

Associated Lab Samples: 60269752001, 60269752002

METHOD BLANK: 2416416

Matrix: Water

Associated Lab Samples: 60269752001, 60269752002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	100	05/10/18 13:18	
Barium	ug/L	ND	10.0	05/10/18 13:18	
Calcium	ug/L	ND	500	05/10/18 13:18	
Iron	ug/L	ND	40.0	05/10/18 13:18	
Magnesium	ug/L	ND	500	05/10/18 13:18	
Manganese	ug/L	ND	5.0	05/10/18 13:18	
Potassium	ug/L	ND	1000	05/10/18 13:18	
Silica	ug/L	ND	214	05/10/18 13:18	
Sodium	ug/L	ND	1000	05/10/18 13:18	
Tot Hardness asCaCO3 (SM 2340B	ug/L	ND	3300	05/10/18 13:18	
Zinc	ug/L	ND	20.0	05/10/18 13:18	

LABORATORY CONTROL SAMPLE: 2416417

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	2500	2590	104	85-115	
Barium	ug/L	250	260	104	85-115	
Calcium	ug/L	12500	12800	103	85-115	
Iron	ug/L	2500	2590	104	85-115	
Magnesium	ug/L	12500	12500	100	85-115	
Manganese	ug/L	250	258	103	85-115	
Potassium	ug/L	12500	12200	98	85-115	
Silica	ug/L	5350	5240	98	85-115	
Sodium	ug/L	12500	12700	102	85-115	
Tot Hardness asCaCO3 (SM 2340B	ug/L	82700	83600	101	85-115	
Zinc	ug/L	1250	1250	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2416418 2416419

Parameter	Units	35389659001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	50.0U	2500	2500	2520	2480	101	99	70-130	1	20	
Barium	ug/L	147	250	250	414	424	107	111	70-130	2	20	
Calcium	ug/L	414000	12500	12500	442000	440000	218	206	70-130	0	20 M1	
Iron	ug/L	0.020U	2500	2500	2430	2460	97	98	70-130	1	20	
Magnesium	ug/L	294000	12500	12500	311000	316000	135	177	70-130	2	20 M1	
Manganese	ug/L	5.0U	250	250	259	260	103	104	70-130	0	20	
Potassium	ug/L	46.9	12500	12500	61500	62500	117	125	70-130	2	20	

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QUALITY CONTROL DATA

Project: RAW WELL

Pace Project No.: 60269752

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2416418											
2416419											
Parameter	Units	35389659001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	Qual
Silica	ug/L	63700	5350	5350	69600	68600	111	92	70-130	1	20
Sodium	ug/L	1150	12500	12500	1360000	1360000	1710	1680	70-130	0	20 E,M1
Tot Hardness asCaCO3 (SM 2340B	ug/L	2240000	82700	82700	2380000	2400000	167	188	70-130	1	20
Zinc	ug/L	20.0U	1250	1250	1140	1210	90	96	70-130	6	20

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2416420											
2416421											
Parameter	Units	35390192001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	Qual
Aluminum	ug/L	<0.050	2500	2500	2610	2600	104	104	70-130	0	20
Barium	ug/L	0.043	250	250	308	308	106	106	70-130	0	20
Calcium	ug/L	1.7	12500	12500	14600	14600	104	103	70-130	0	20
Iron	ug/L	0.24	2500	2500	2850	2850	104	104	70-130	0	20
Magnesium	ug/L	1.1	12500	12500	13800	13800	102	102	70-130	0	20
Manganese	ug/L	0.013	250	250	272	271	104	103	70-130	0	20
Potassium	ug/L	1.2	12500	12500	13600	13600	99	99	70-130	0	20
Silica	ug/L	18.8	5350	5350	24800	24600	113	109	70-130	1	20
Sodium	ug/L	7.6	12500	12500	20400	20300	102	102	70-130	0	20
Tot Hardness asCaCO3 (SM 2340B	ug/L	8.7	82700	82700	93400	93200	102	102	70-130	0	20
Zinc	ug/L	0.068	1250	1250	1320	1320	100	100	70-130	0	20

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QUALITY CONTROL DATA

Project: RAW WELL

Pace Project No.: 60269752

QC Batch: 445569

Analysis Method: EPA 200.8

QC Batch Method: EPA 200.8

Analysis Description: 200.8 MET Drinking Water

Associated Lab Samples: 60269752001

METHOD BLANK: 2416422

Matrix: Water

Associated Lab Samples: 60269752001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	ug/L	ND	1.0	05/09/18 16:42	
Selenium	ug/L	ND	1.0	05/09/18 16:42	

LABORATORY CONTROL SAMPLE: 2416423

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	50	51.6	103	85-115	
Selenium	ug/L	50	51.8	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2416424 2416425

Parameter	Units	2075715001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	0.63J	50	50	50.8	51.4	100	102	70-130	1	20	
Selenium	ug/L	ND	50	50	51.1	52.2	101	104	70-130	2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2416426 2416427

Parameter	Units	35390192003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	0.0012	50	50	49.5	50.5	97	99	70-130	2	20	
Selenium	ug/L	<0.00050	50	50	48.5	48.7	97	97	70-130	0	20	

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QUALITY CONTROL DATA

Project: RAW WELL

Pace Project No.: 60269752

QC Batch: 446923

Analysis Method: EPA 524.2

QC Batch Method: EPA 524.2

Analysis Description: 524.2 THM MSV

Associated Lab Samples: 60269752001, 60269752002

METHOD BLANK: 2424024

Matrix: Water

Associated Lab Samples: 60269752001, 60269752002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Bromodichloromethane	ug/L	ND	1.0	05/13/18 07:49	
Bromoform	ug/L	ND	1.0	05/13/18 07:49	
Chloroform	ug/L	ND	0.50	05/13/18 07:49	
Dibromochloromethane	ug/L	ND	1.0	05/13/18 07:49	
Total Trihalomethanes (Calc.)	ug/L	ND	1.0	05/13/18 07:49	
1,2-Dichloroethane-d4 (S)	%	106	70-130	05/13/18 07:49	
4-Bromofluorobenzene (S)	%	100	70-130	05/13/18 07:49	
Toluene-d8 (S)	%	103	70-130	05/13/18 07:49	

LABORATORY CONTROL SAMPLE & LCSD: 2424025

2424026

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Bromodichloromethane	ug/L	10	10.0	9.5	100	95	70-130	5	40	
Bromoform	ug/L	10	9.6	9.6	96	96	70-130	0	40	
Chloroform	ug/L	10	10.5	8.7	105	87	70-130	19	40	
Dibromochloromethane	ug/L	10	9.1	9.0	91	90	70-130	2	40	
Total Trihalomethanes (Calc.)	ug/L	40	39.2	36.7	98	92	70-130	6	40	
1,2-Dichloroethane-d4 (S)	%				108	106	70-130			
4-Bromofluorobenzene (S)	%				100	101	70-130			
Toluene-d8 (S)	%				107	105	70-130			

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QUALITY CONTROL DATA

Project: RAW WELL
Pace Project No.: 60269752

QC Batch: 446174 Analysis Method: EPA 552.3
QC Batch Method: EPA 552.3 Analysis Description: 5523 Haloacetic Acids
Associated Lab Samples: 60269752001, 60269752002

METHOD BLANK: 2419590 Matrix: Water
Associated Lab Samples: 60269752001, 60269752002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Dibromoacetic Acid	ug/L	ND	1.0	05/14/18 11:58	
Dichloroacetic Acid	ug/L	ND	1.0	05/14/18 11:58	
Haloacetic Acids (Total)	ug/L	ND	1.0	05/14/18 11:58	
Monobromoacetic Acid	ug/L	ND	1.0	05/14/18 11:58	
Monochloroacetic Acid	ug/L	ND	1.0	05/14/18 11:58	
Trichloroacetic Acid	ug/L	ND	1.0	05/14/18 11:58	
2,3-Dibromopropanoic Acid (S)	%	88	70-130	05/14/18 11:58	

LABORATORY CONTROL SAMPLE: 2419591

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Dibromoacetic Acid	ug/L	10	9.1	91	70-130	
Dichloroacetic Acid	ug/L	10	10.1	101	70-130	
Haloacetic Acids (Total)	ug/L	50	49.7	99	70-130	
Monobromoacetic Acid	ug/L	10	10.1	101	70-130	
Monochloroacetic Acid	ug/L	10	10.3	103	70-130	
Trichloroacetic Acid	ug/L	10	10.1	101	70-130	
2,3-Dibromopropanoic Acid (S)	%			115	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2420000 2420001

Parameter	Units	35390341001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Dibromoacetic Acid	ug/L	2.9	10	10	13.4	13.7	105	108	70-130	2	30	
Dichloroacetic Acid	ug/L	11.1	10	10	22.9	22.9	118	119	70-130	0	30	
Haloacetic Acids (Total)	ug/L	19.1	50	50	93.4	90.6	149	143	70-130	3	30	
Monobromoacetic Acid	ug/L	<0.29	10	10	15.4	15.2	154	152	70-130	1	30	M1
Monochloroacetic Acid	ug/L	<0.90	10	10	25.2	21.8	252	218	70-130	14	30	M1
Trichloroacetic Acid	ug/L	5.2	10	10	16.6	16.9	114	117	70-130	2	30	
2,3-Dibromopropanoic Acid (S)	%						94	95	70-130		30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2420002 2420003

Parameter	Units	35390341002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Dibromoacetic Acid	ug/L	2.8	10	10	13.9	14.5	111	117	70-130	4	30	

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QUALITY CONTROL DATA

Project: RAW WELL

Pace Project No.: 60269752

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2420002											
2420003											
Parameter	Units	35390341002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	Qual
Dichloroacetic Acid	ug/L	11.6	10	10	22.9	23.5	113	119	70-130	3	30
Haloacetic Acids (Total)	ug/L	23.0	50	50	88.1	87.1	130	128	70-130	1	30
Monobromoacetic Acid	ug/L	0.77J	10	10	15.7	14.3	150	135	70-130	10	30 M1
Monochloroacetic Acid	ug/L	1.2	10	10	17.4	16.1	162	148	70-130	8	30 M1
Trichloroacetic Acid	ug/L	6.6	10	10	18.1	18.7	115	122	70-130	3	30
2,3-Dibromopropanoic Acid (S)	%						94	97	70-130		30

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: RAW WELL

Pace Project No.: 60269752

QC Batch: 526267

Analysis Method: EPA 120.1

QC Batch Method: EPA 120.1

Analysis Description: Field Specific Conductance

Associated Lab Samples: 60269752001, 60269752002

SAMPLE DUPLICATE: 2155024

Parameter	Units	60269752001 Result	Dup Result	RPD	Max RPD	Qualifiers
Specific Conductance	umhos/cm	1250	1260	0	20	

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QUALITY CONTROL DATA

Project: RAW WELL

Pace Project No.: 60269752

QC Batch: 526266

Analysis Method: SM 4500-H+B

QC Batch Method: SM 4500-H+B

Analysis Description: Field pH, Electrometric

Associated Lab Samples: 60269752001, 60269752002

SAMPLE DUPLICATE: 2155023

Parameter	Units	60269752001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH	Std. Units	7.2	7.2	0	5	

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QUALITY CONTROL DATA

Project: RAW WELL

Pace Project No.: 60269752

QC Batch: 447845

Analysis Method: SM 2320B

QC Batch Method: SM 2320B

Analysis Description: 2320B Alkalinity

Associated Lab Samples: 60269752001, 60269752002

METHOD BLANK: 2427830

Matrix: Water

Associated Lab Samples: 60269752001, 60269752002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	ND	5.0	05/16/18 16:19	

LABORATORY CONTROL SAMPLE: 2427831

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	256	255	99	90-110	

SAMPLE DUPLICATE: 2427832

Parameter	Units	35389757002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	157	156	1	20	

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QUALITY CONTROL DATA

Project: RAW WELL

Pace Project No.: 60269752

QC Batch:	446479	Analysis Method:	SM 2510B
QC Batch Method:	SM 2510B	Analysis Description:	2510B Specific Conductance
Associated Lab Samples: 60269752001, 60269752002			

METHOD BLANK: 2421273 Matrix: Water

Associated Lab Samples: 60269752001, 60269752002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Specific Conductance @ 25C	umhos/cm	ND	2.0	05/11/18 09:42	

LABORATORY CONTROL SAMPLE: 2421274

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Specific Conductance @ 25C	umhos/cm	1410	1420	100	95-105	

SAMPLE DUPLICATE: 2421275

Parameter	Units	35389347001 Result	Dup Result	RPD	Max RPD	Qualifiers
Specific Conductance @ 25C	umhos/cm	3030	3020	0	20	

SAMPLE DUPLICATE: 2421276

Parameter	Units	35391129001 Result	Dup Result	RPD	Max RPD	Qualifiers
Specific Conductance @ 25C	umhos/cm	2.0U	ND		20	

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QUALITY CONTROL DATA

Project: RAW WELL

Pace Project No.: 60269752

QC Batch:	445665	Analysis Method:	SM 2540C
QC Batch Method:	SM 2540C	Analysis Description:	2540C Total Dissolved Solids
Associated Lab Samples: 60269752001, 60269752002			

METHOD BLANK: 2416821 Matrix: Water

Associated Lab Samples: 60269752001, 60269752002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	5.0	05/09/18 12:39	

LABORATORY CONTROL SAMPLE: 2416822

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	300	294	98	90-110	

SAMPLE DUPLICATE: 2416823

Parameter	Units	35390150002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	2590	2720	5	5	

SAMPLE DUPLICATE: 2416824

Parameter	Units	35390164007 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	5.0U	ND		5	

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QUALITY CONTROL DATA

Project: RAW WELL

Pace Project No.: 60269752

QC Batch: 445594

Analysis Method: SM 4500-S2F

QC Batch Method: SM 4500-S2F

Analysis Description: 4500S2F Sulfide

Associated Lab Samples: 60269752001, 60269752002

METHOD BLANK: 2416572

Matrix: Water

Associated Lab Samples: 60269752001, 60269752002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	05/08/18 14:04	

LABORATORY CONTROL SAMPLE: 2416573

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	6	5.6	93	80-120	

MATRIX SPIKE SAMPLE: 2416575

Parameter	Units	35389825001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.10U	6	5.5	92	80-120	

SAMPLE DUPLICATE: 2416574

Parameter	Units	35389804001 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfide	mg/L	1.4	1.4	0	20	

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QUALITY CONTROL DATA

Project: RAW WELL

Pace Project No.: 60269752

QC Batch: 446057

Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0

Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60269752001, 60269752002

METHOD BLANK: 2418873

Matrix: Water

Associated Lab Samples: 60269752001, 60269752002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	ND	5.0	05/09/18 23:38	
Fluoride	mg/L	ND	0.050	05/09/18 23:38	
Sulfate	mg/L	ND	5.0	05/09/18 23:38	

LABORATORY CONTROL SAMPLE: 2418874

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	48.1	96	90-110	
Fluoride	mg/L	5	5.0	99	90-110	
Sulfate	mg/L	50	47.8	96	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2421200 2421201

Parameter	Units	35390474001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	36.8	50	50	88.3	88.2	103	103	90-110	0	20	
Fluoride	mg/L	0.31	5	5	5.1	5.1	95	95	90-110	0	20	
Sulfate	mg/L	<2.5	50	50	46.1	46.1	89	89	90-110	0	20 M1	

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QUALITY CONTROL DATA

Project: RAW WELL

Pace Project No.: 60269752

QC Batch: 445203

Analysis Method: EPA 353.2

QC Batch Method: EPA 353.2

Analysis Description: 353.2 Nitrate + Nitrite, Unpres.

Associated Lab Samples: 60269752001, 60269752002

METHOD BLANK: 2414928

Matrix: Water

Associated Lab Samples: 60269752001, 60269752002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, Nitrate	mg/L	ND	0.050	05/05/18 08:13	

MATRIX SPIKE SAMPLE: 2414931

Parameter	Units	35390164002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Nitrite	mg/L	0.025U	1	0.95	94	90-110	

MATRIX SPIKE SAMPLE: 2414933

Parameter	Units	35390200002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Nitrite	mg/L	0.025U	1	0.96	95	90-110	

SAMPLE DUPLICATE: 2414930

Parameter	Units	35390164002 Result	Dup Result	RPD	Max RPD	Qualifiers
Nitrogen, Nitrate	mg/L	0.025U	ND		20	

SAMPLE DUPLICATE: 2414932

Parameter	Units	35390200002 Result	Dup Result	RPD	Max RPD	Qualifiers
Nitrogen, Nitrate	mg/L	0.025U	ND		20	

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QUALITY CONTROL DATA

Project: RAW WELL

Pace Project No.: 60269752

QC Batch: 446275

Analysis Method: EPA 365.4

QC Batch Method: EPA 365.4

Analysis Description: 365.4 Phosphorus

Associated Lab Samples: 60269752001, 60269752002

METHOD BLANK: 2420280

Matrix: Water

Associated Lab Samples: 60269752001, 60269752002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Phosphorus, Total (as P)	mg/L	ND	0.10	05/14/18 13:45	N2

LABORATORY CONTROL SAMPLE: 2420281

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus, Total (as P)	mg/L	4	4.0	100	90-110	N2

MATRIX SPIKE SAMPLE: 2420283

Parameter	Units	35390471001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus, Total (as P)	mg/L	0.50	4	4.5	99	80-120	N2

SAMPLE DUPLICATE: 2420282

Parameter	Units	35390471001 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus, Total (as P)	mg/L	0.50	0.50	1	20	N2

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: RAW WELL

Pace Project No.: 60269752

Sample: RAW WELL #1		Lab ID: 60269752001	Collected: 05/04/18 11:45	Received: 05/05/18 11:20	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac		Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 900.0	8.81 ± 3.21 (3.69) C:NA T:NA		pCi/L	05/29/18 19:33	12587-46-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: RAW WELL

Pace Project No.: 60269752

Sample: RAW WELL #3		Lab ID: 60269752002	Collected: 05/04/18 12:05	Received: 05/05/18 11:20	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac		Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 900.0	13.3 ± 3.63 (2.77) C:NA T:NA		pCi/L	05/29/18 19:33	12587-46-1	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: RAW WELL

Pace Project No.: 60269752

QC Batch: 299148

Analysis Method: EPA 900.0

QC Batch Method: EPA 900.0

Analysis Description: 900.0 Gross Alpha/Beta

Associated Lab Samples: 60269752001, 60269752002

METHOD BLANK: 1464739

Matrix: Water

Associated Lab Samples: 60269752001, 60269752002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Gross Alpha	-0.228 ± 0.346 (1.25) C:NA T:NA	pCi/L	05/28/18 11:49	

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QUALIFIERS

Project: RAW WELL

Pace Project No.: 60269752

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval).

Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-O Pace Analytical Services - Ormond Beach

PASI-PA Pace Analytical Services - Greensburg

PASI-SE Pace Analytical Services - SE Kansas

ANALYTE QUALIFIERS

E Analyte concentration exceeded the calibration range. The reported result is estimated.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

N2 The lab does not hold NELAC/TNI accreditation for this parameter.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: RAW WELL
Pace Project No.: 60269752

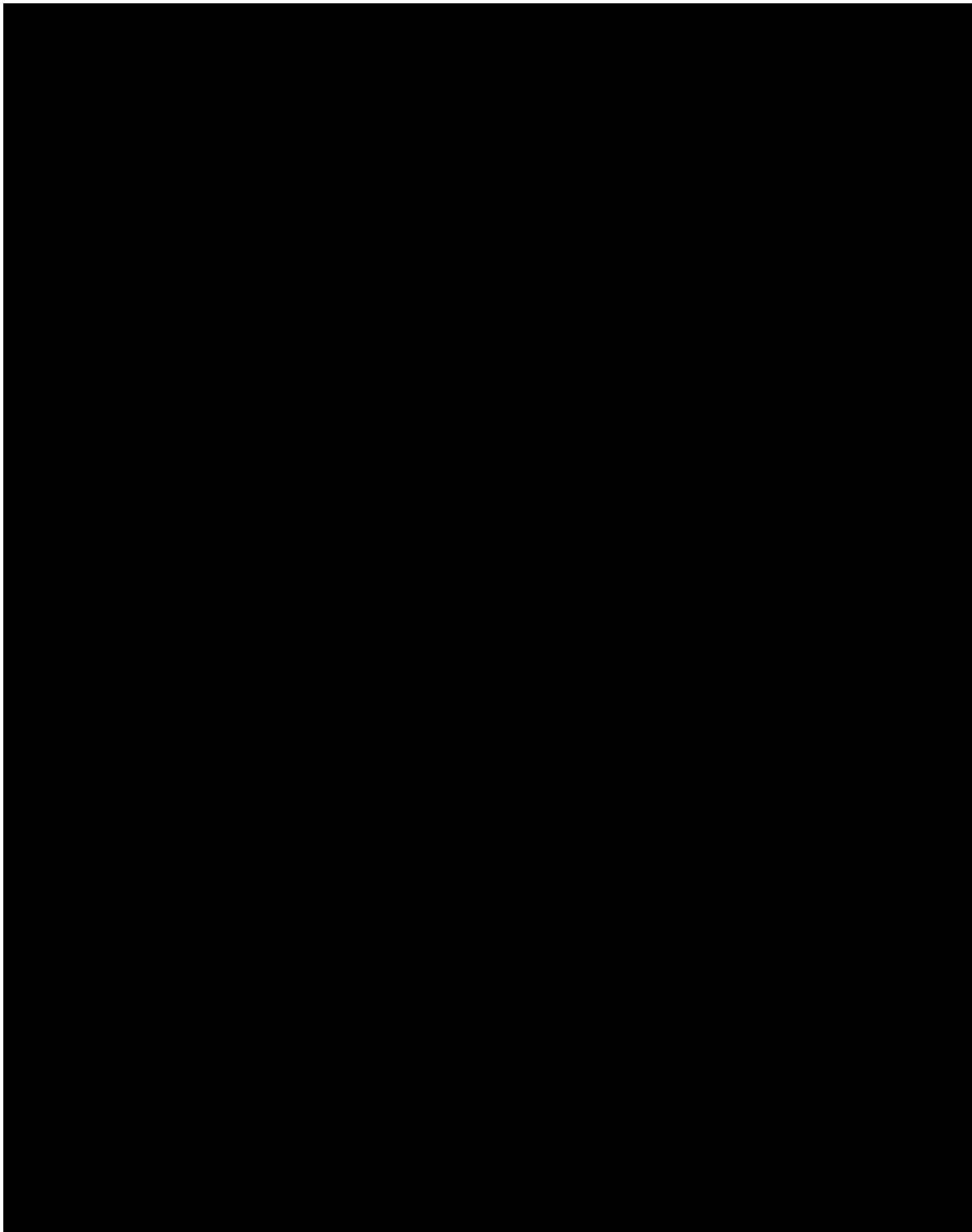
Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60269752001	RAW WELL #1				
60269752002	RAW WELL #3				
60269752001	RAW WELL #1	EPA 552.3	446174	EPA 552.3	446955
60269752002	RAW WELL #3	EPA 552.3	446174	EPA 552.3	446955
60269752001	RAW WELL #1	EPA 200.7	445568	EPA 200.7	445658
60269752002	RAW WELL #3	EPA 200.7	445568	EPA 200.7	445658
60269752001	RAW WELL #1	EPA 200.8	445569	EPA 200.8	445656
60269752002	RAW WELL #3	EPA 200.8	445623		
60269752001	RAW WELL #1	EPA 524.2	446923		
60269752002	RAW WELL #3	EPA 524.2	446923		
60269752001	RAW WELL #1	EPA 900.0	299148		
60269752002	RAW WELL #3	EPA 900.0	299148		
60269752001	RAW WELL #1	EPA 120.1	526267		
60269752002	RAW WELL #3	EPA 120.1	526267		
60269752001	RAW WELL #1	SM 4500-H+B	526266		
60269752002	RAW WELL #3	SM 4500-H+B	526266		
60269752001	RAW WELL #1	SM 2320B	447845		
60269752002	RAW WELL #3	SM 2320B	447845		
60269752001	RAW WELL #1	SM 2510B	446479		
60269752002	RAW WELL #3	SM 2510B	446479		
60269752001	RAW WELL #1	SM 2540C	445665		
60269752002	RAW WELL #3	SM 2540C	445665		
60269752001	RAW WELL #1	SM 4500-S2F	445594		
60269752002	RAW WELL #3	SM 4500-S2F	445594		
60269752001	RAW WELL #1	SM 4500-S2H	447086		
60269752002	RAW WELL #3	SM 4500-S2H	447086		
60269752001	RAW WELL #1	SM 2330B	448387		
60269752002	RAW WELL #3	SM 2330B	448387		
60269752001	RAW WELL #1	EPA 300.0	446057		
60269752002	RAW WELL #3	EPA 300.0	446057		
60269752001	RAW WELL #1	EPA 353.2	445203		
60269752002	RAW WELL #3	EPA 353.2	445203		
60269752001	RAW WELL #1	EPA 365.4	446275	EPA 365.4	447013
60269752002	RAW WELL #3	EPA 365.4	446275	EPA 365.4	447013

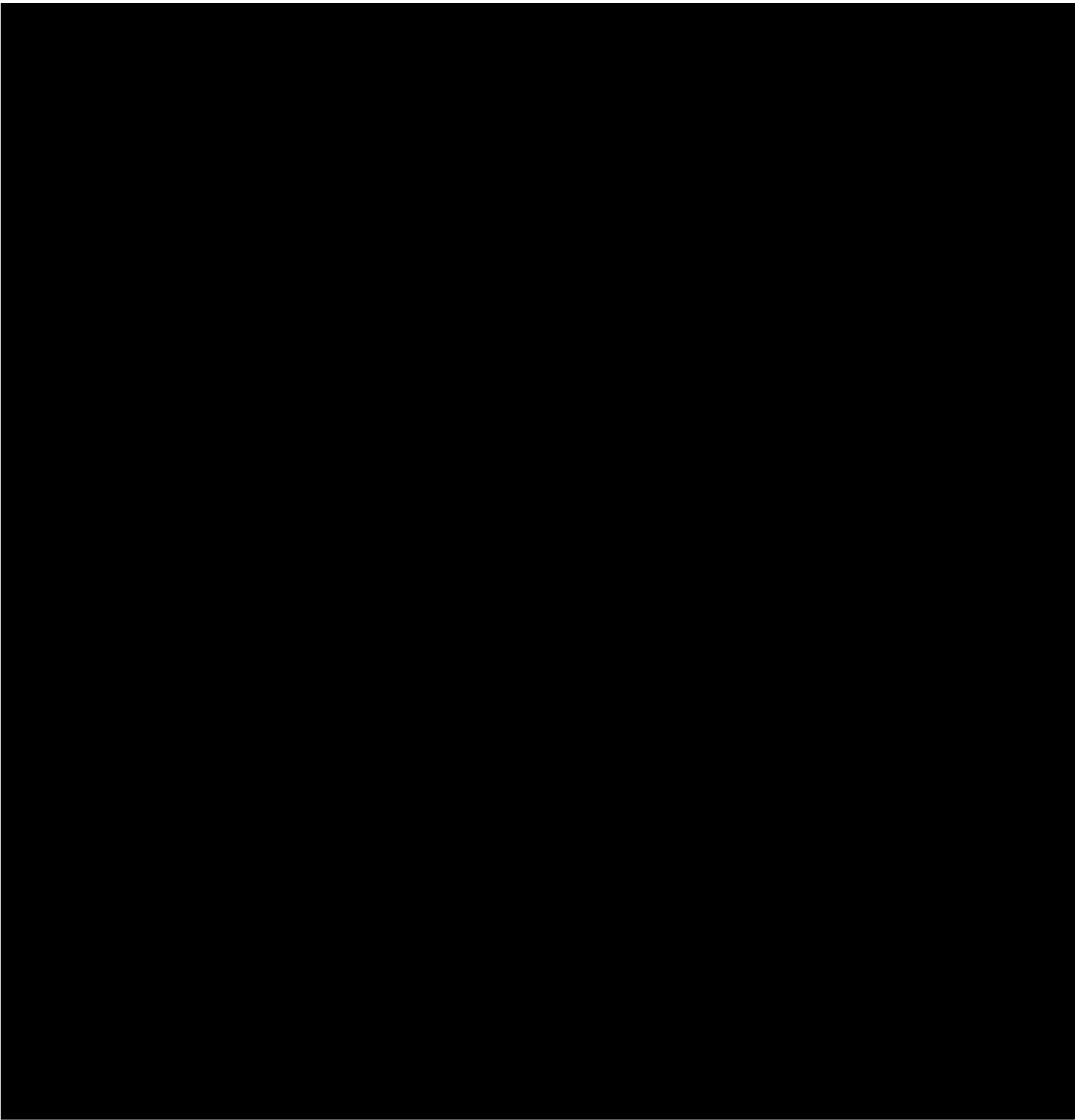
REPORT OF LABORATORY ANALYSIS

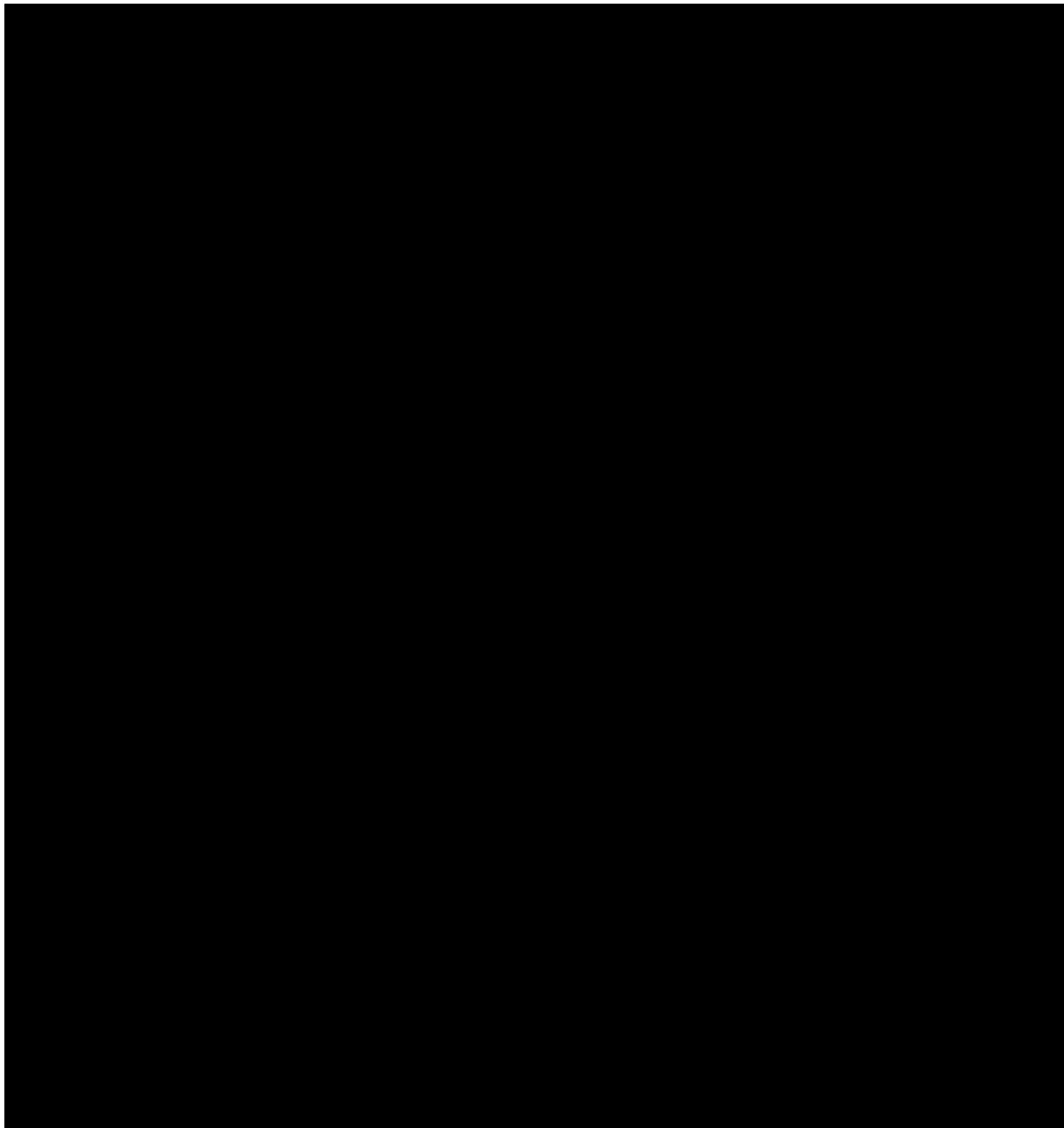
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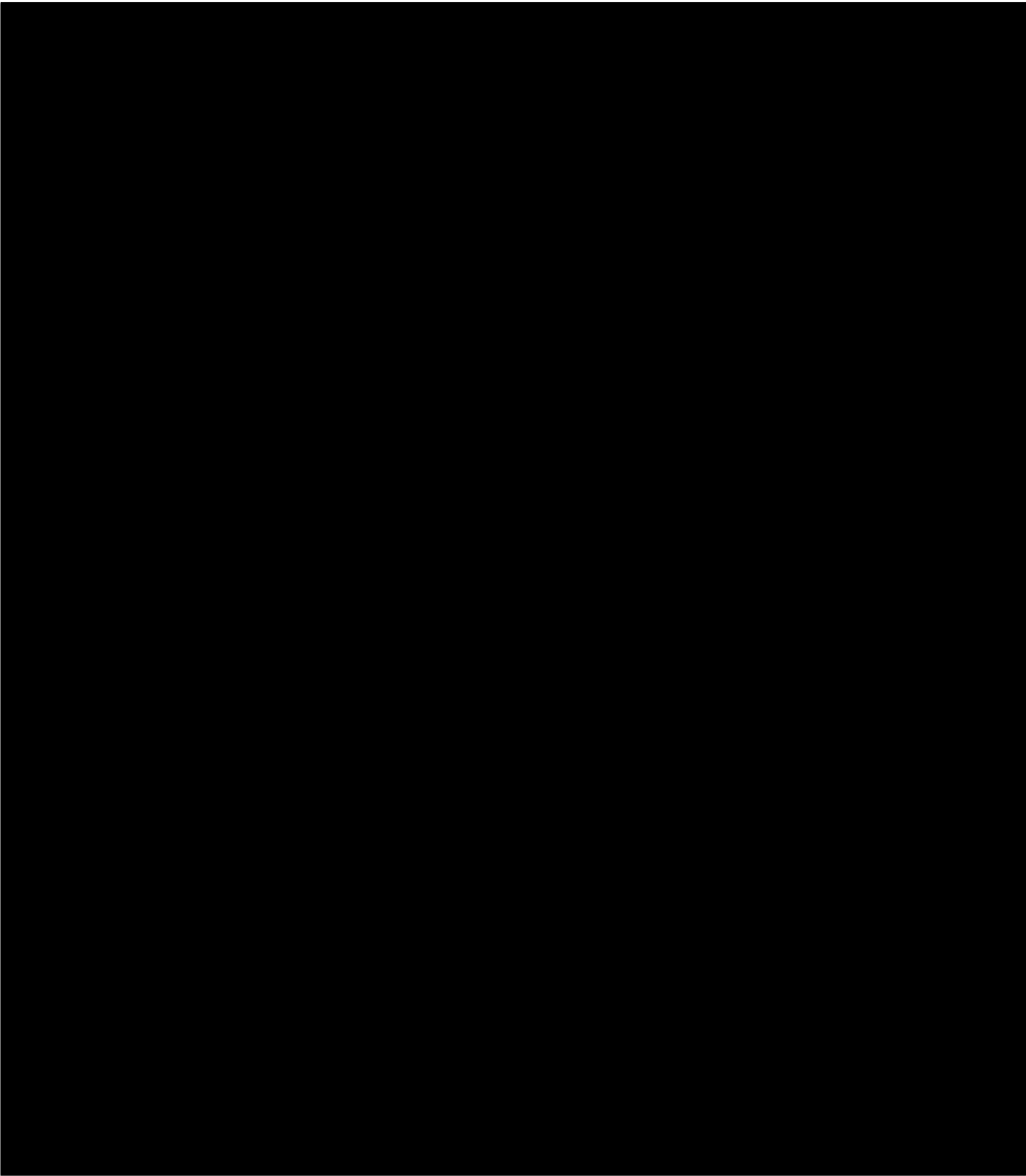
APPENDIX D

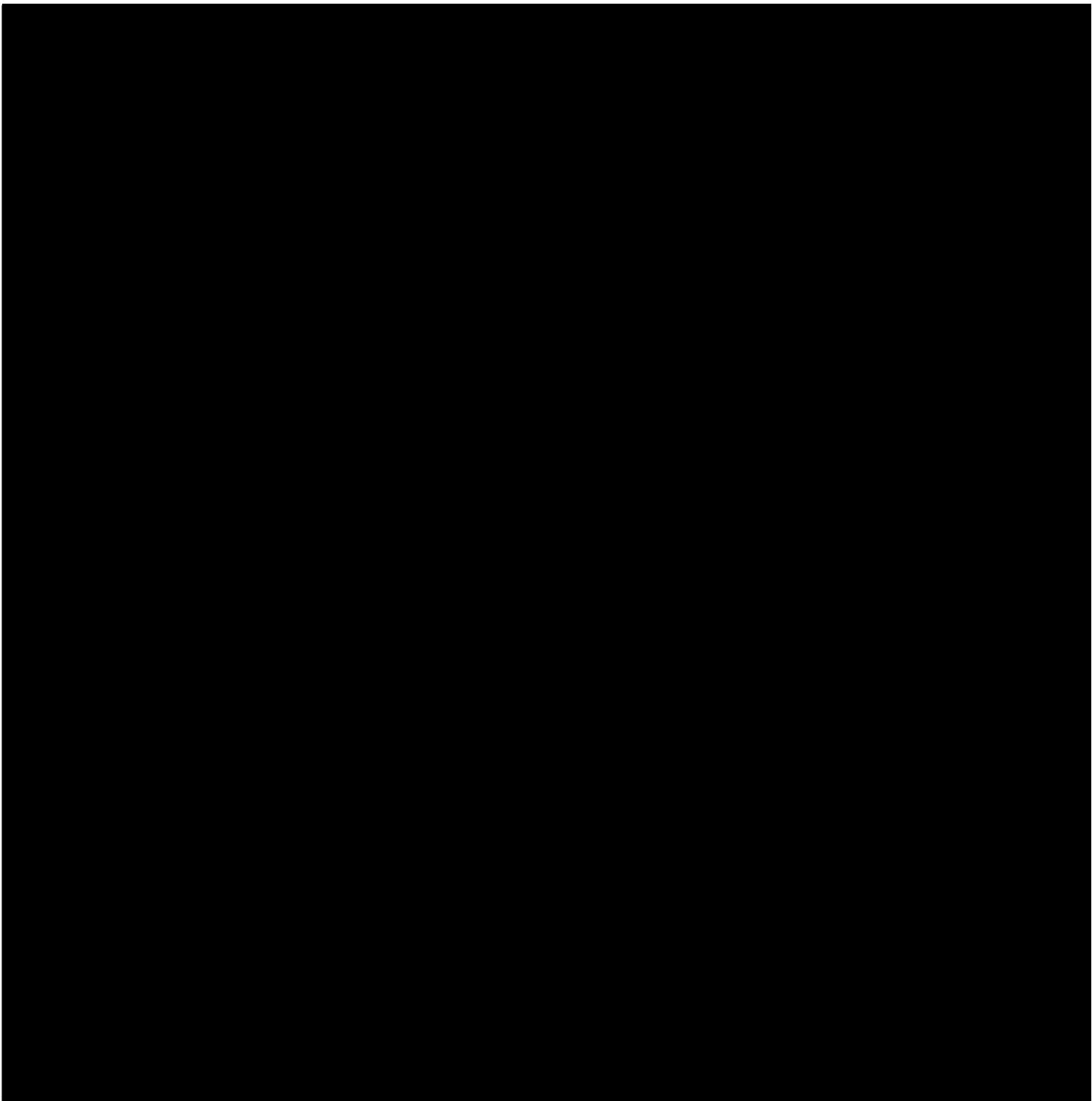
75,000 GALLON ELEVATED WATER STORAGE TANK INSPECTION REPORT

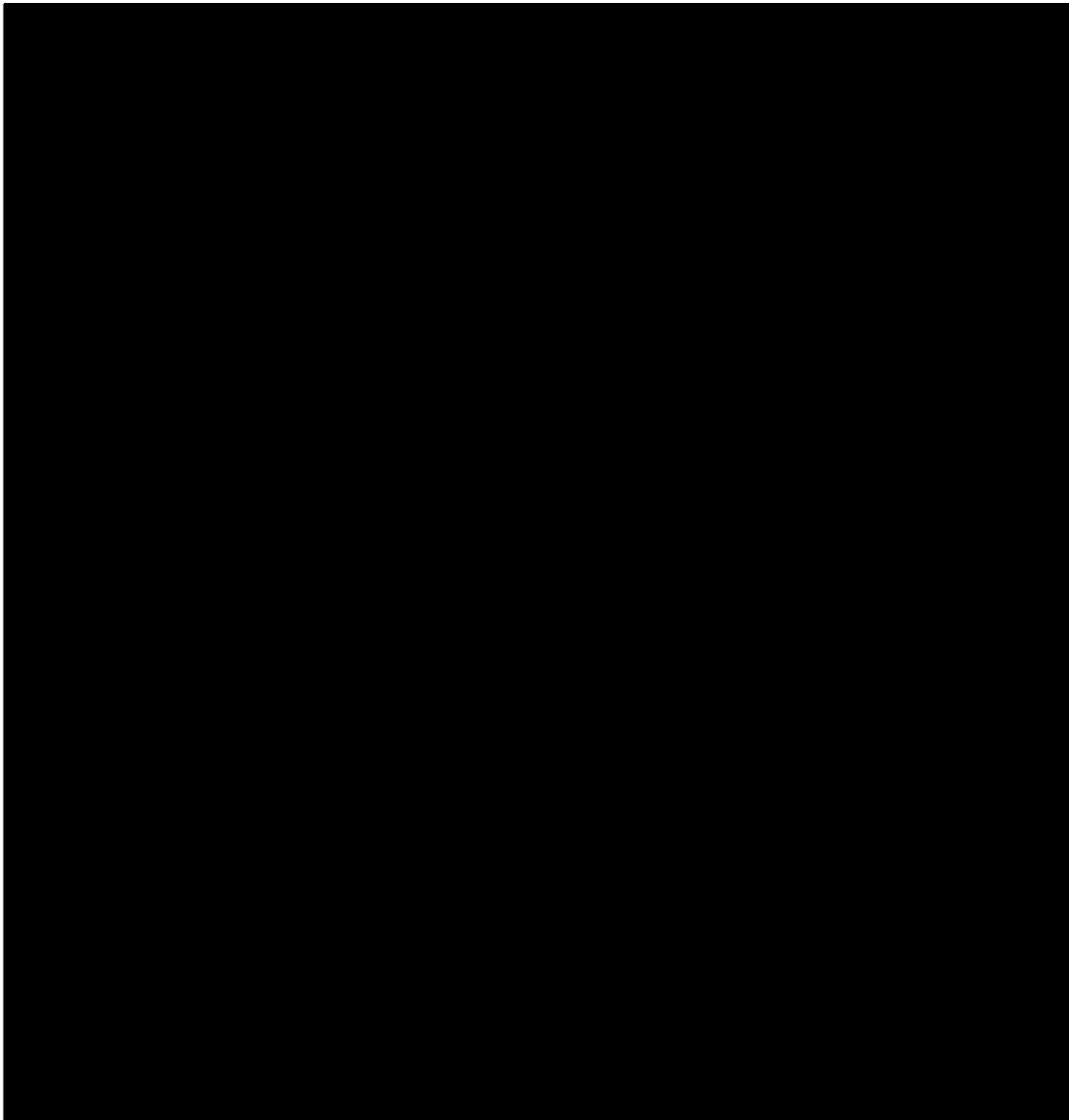


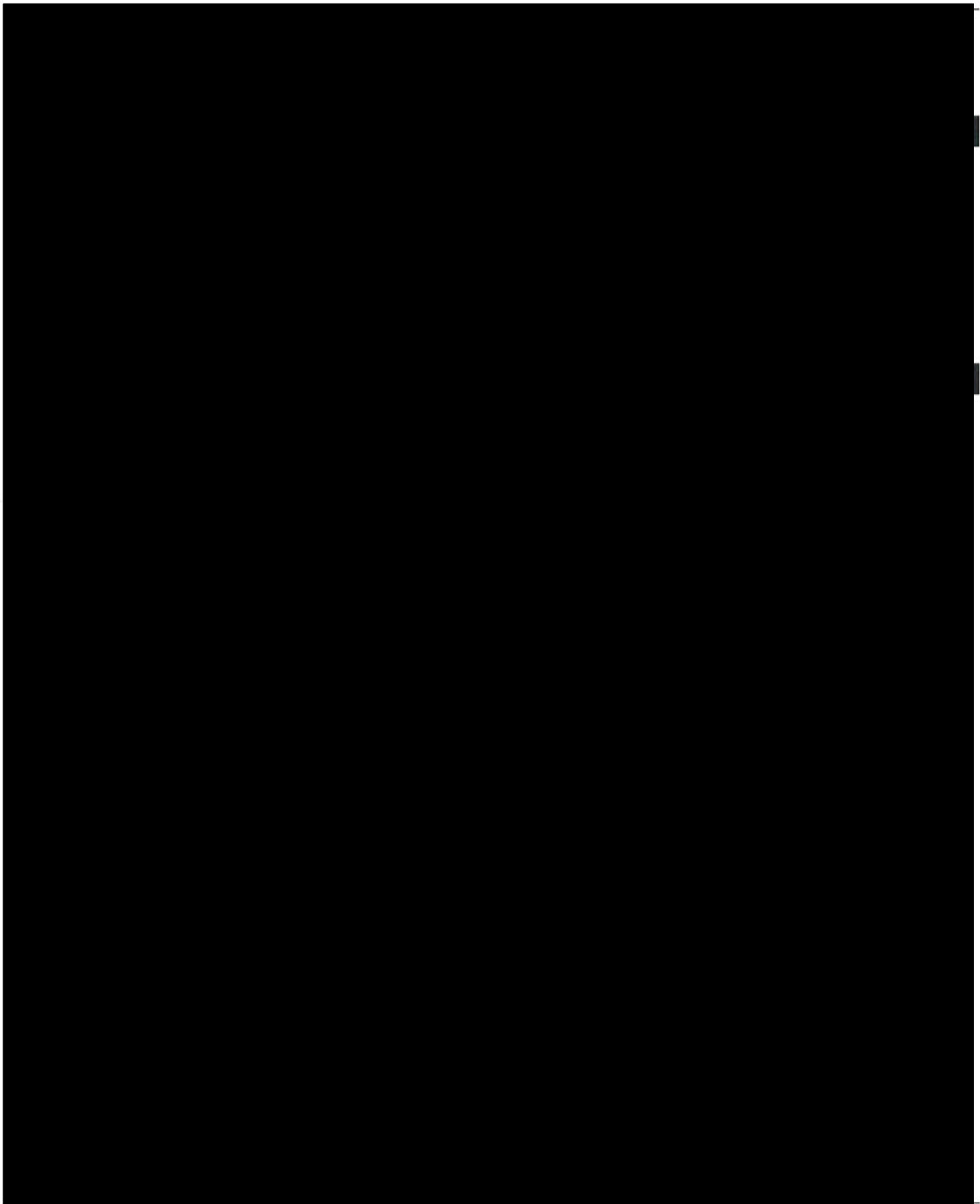


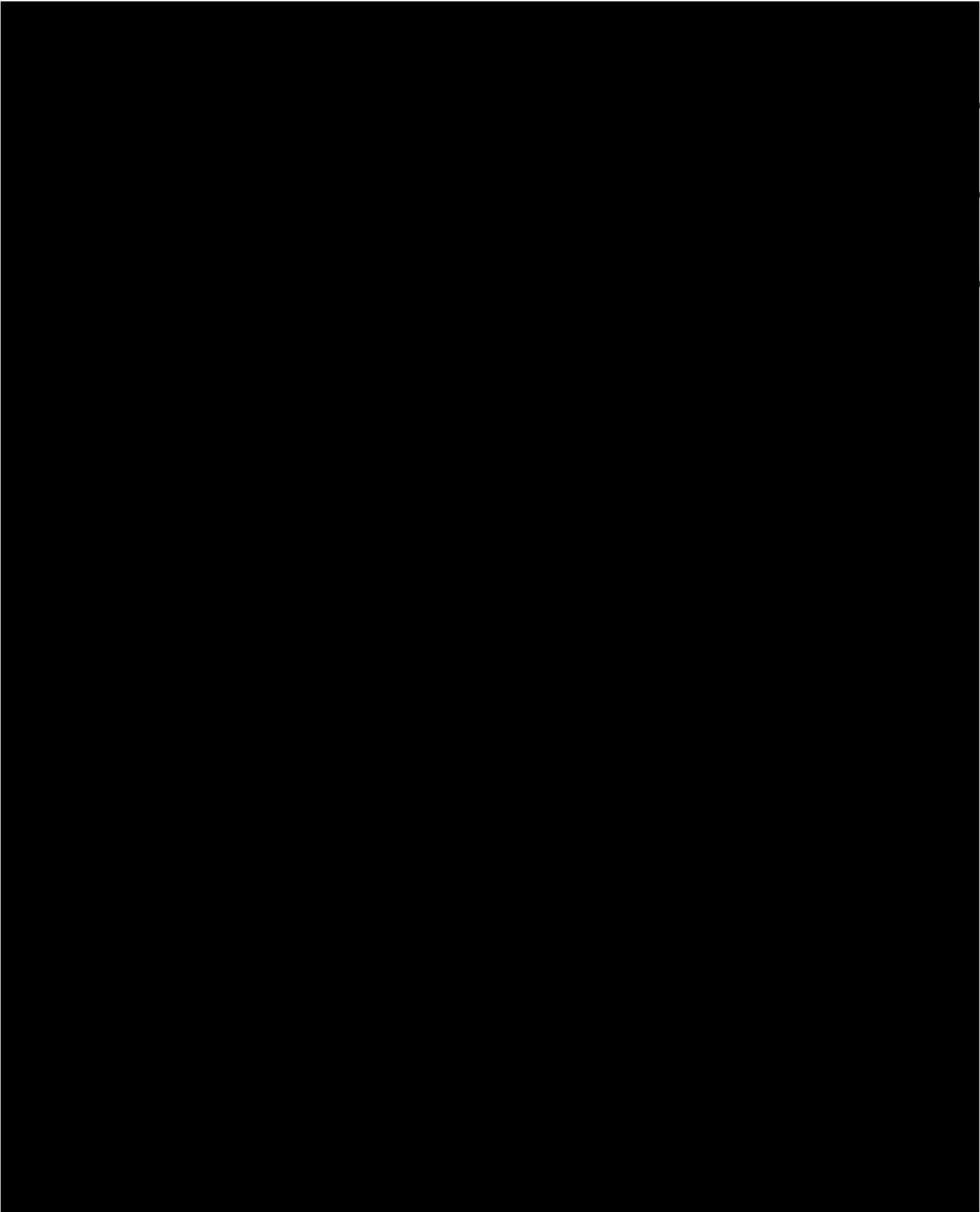


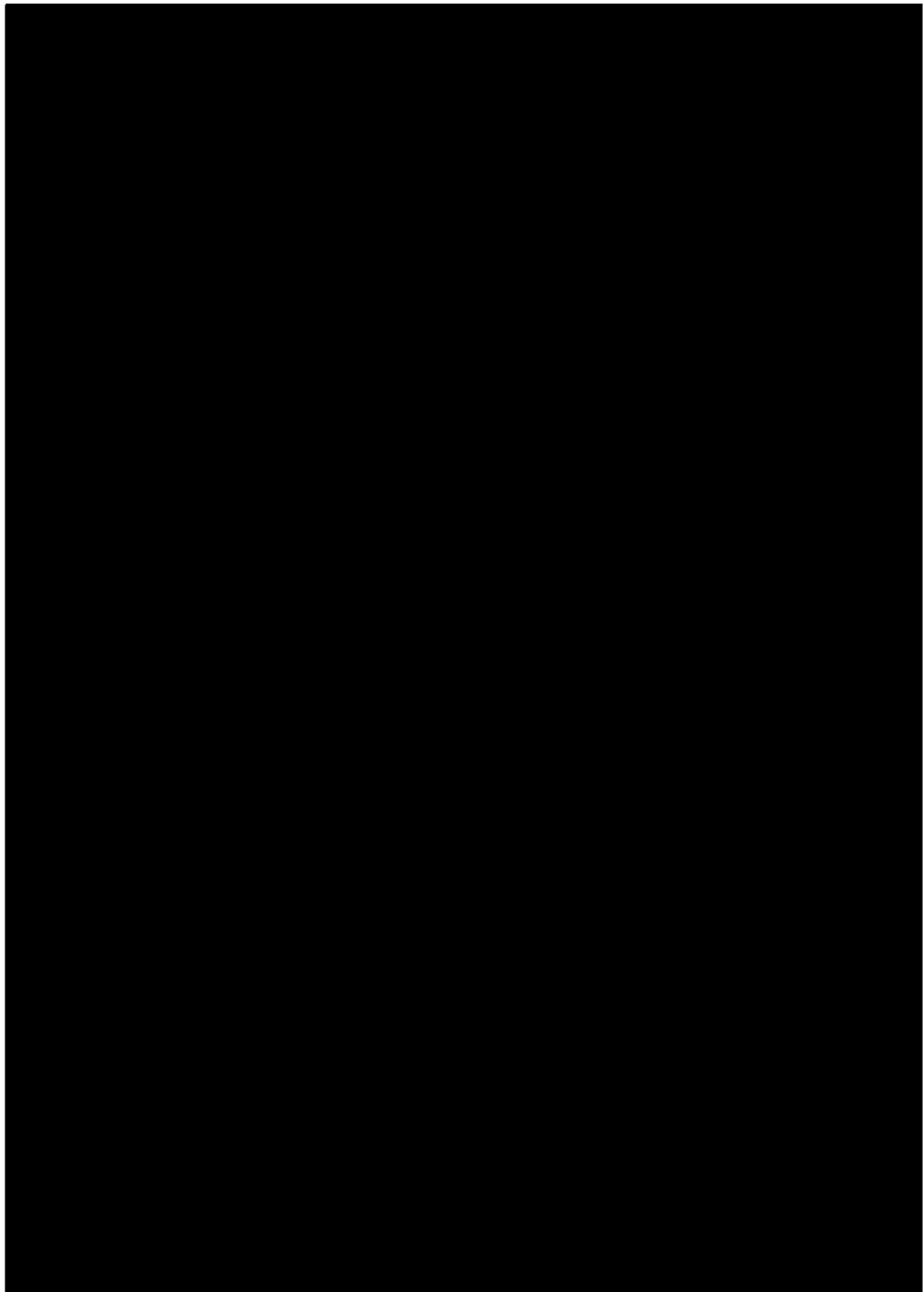


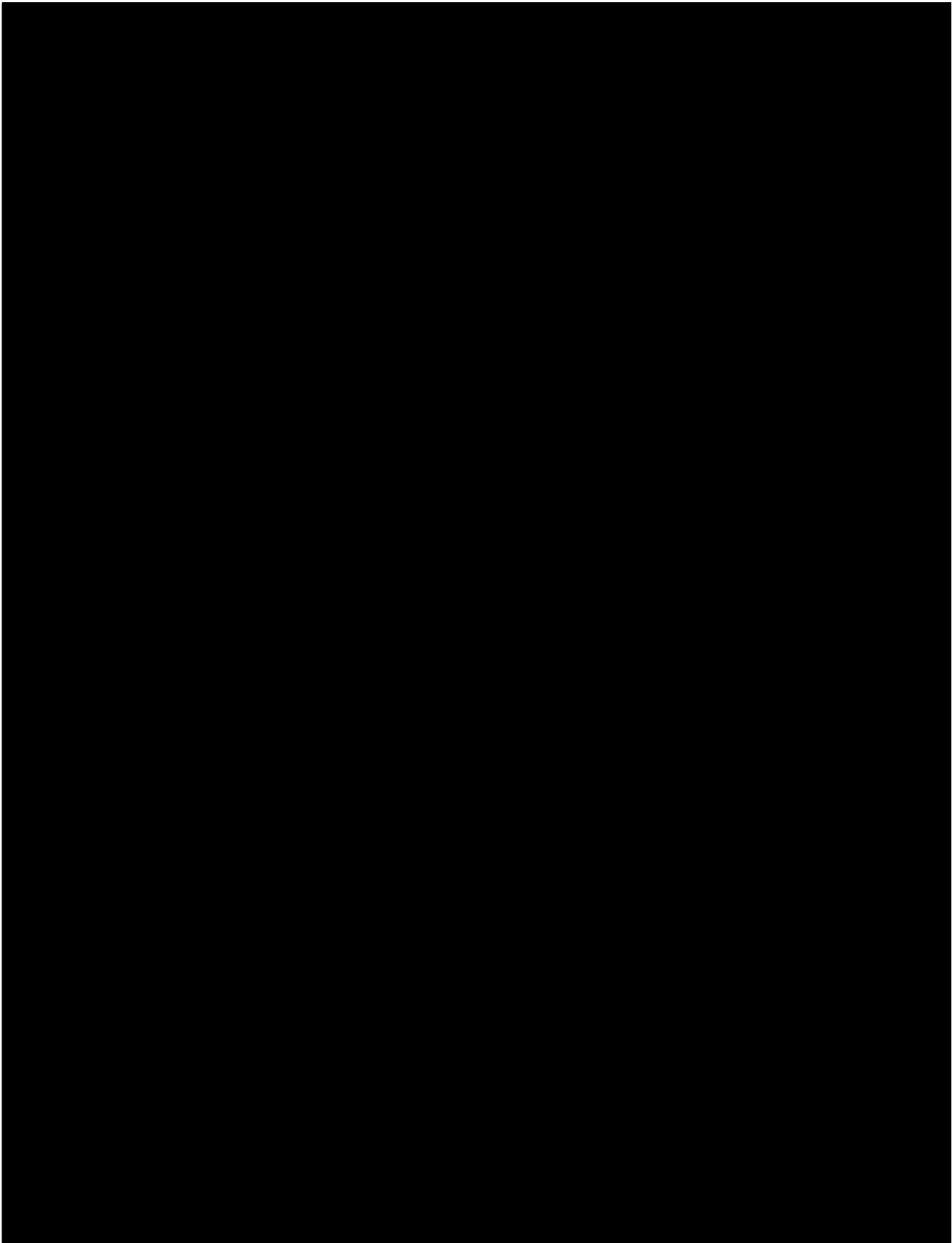


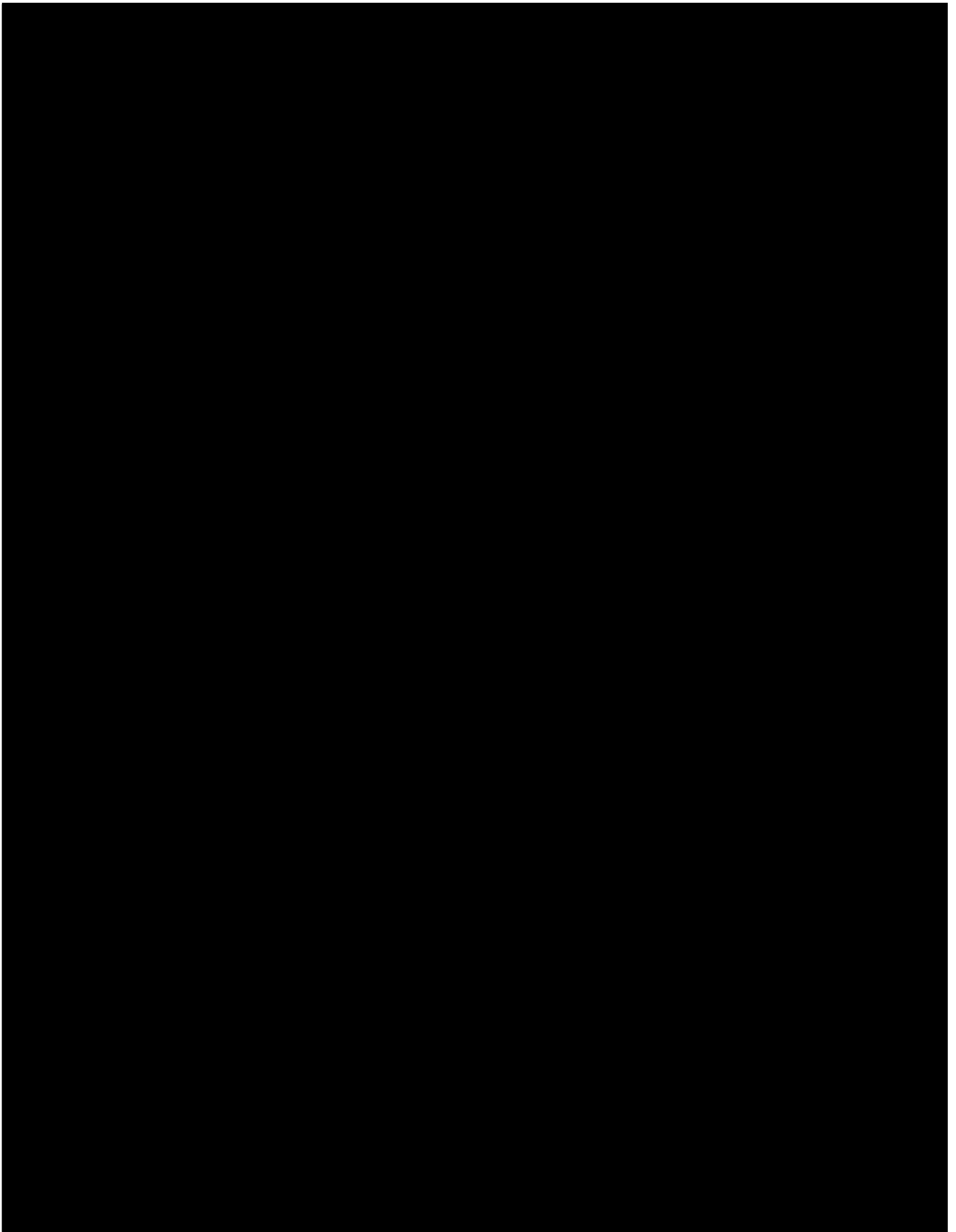


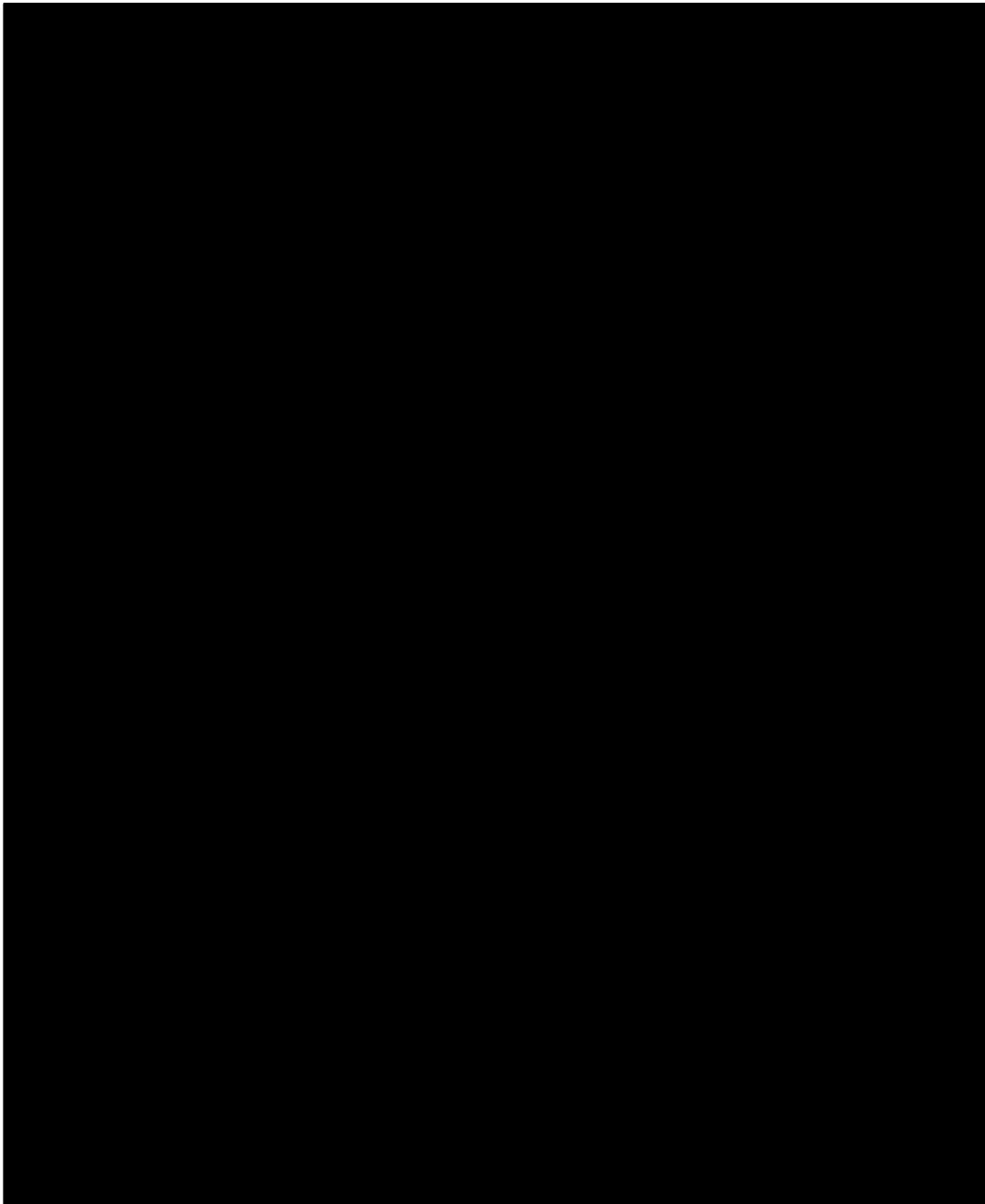


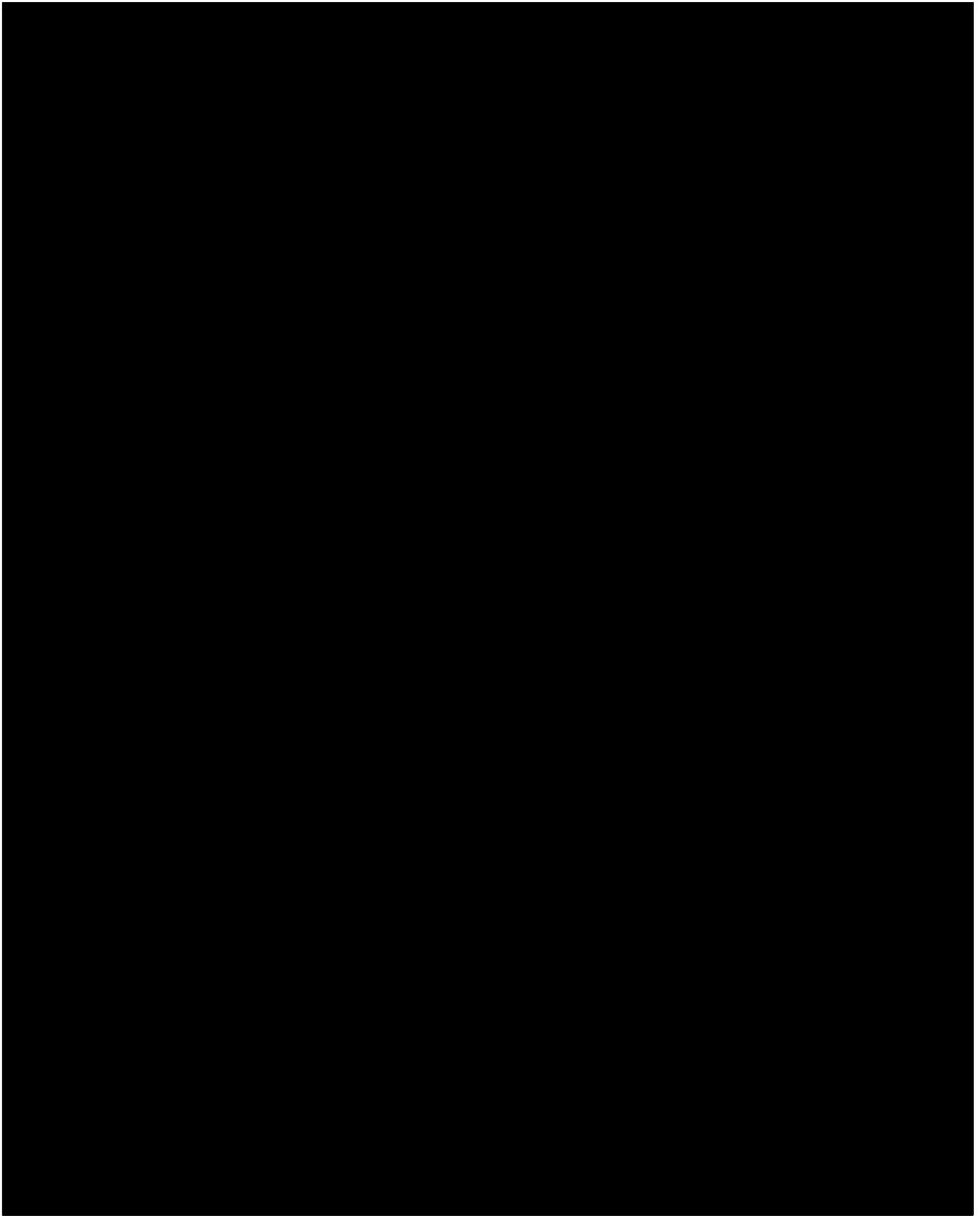


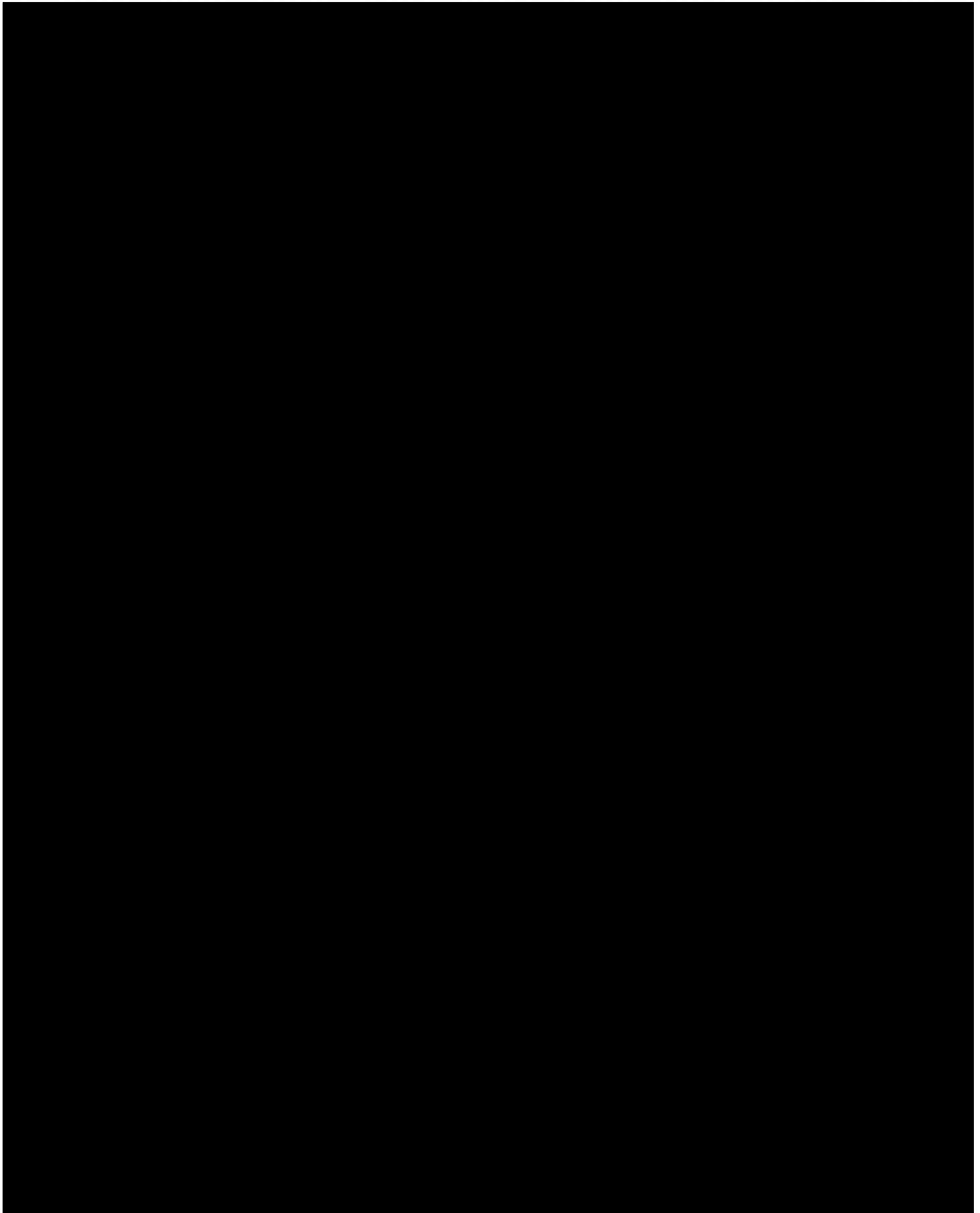


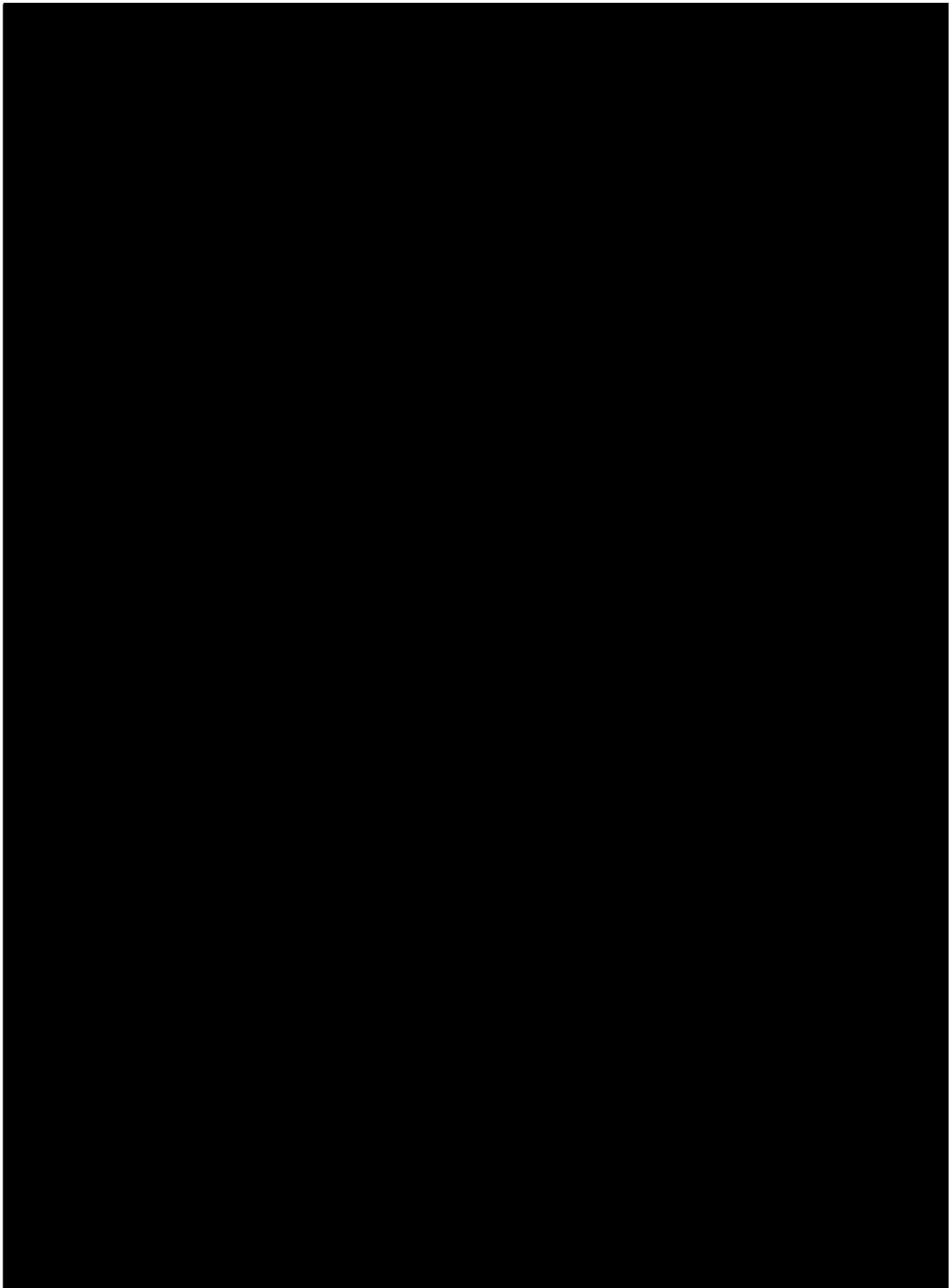


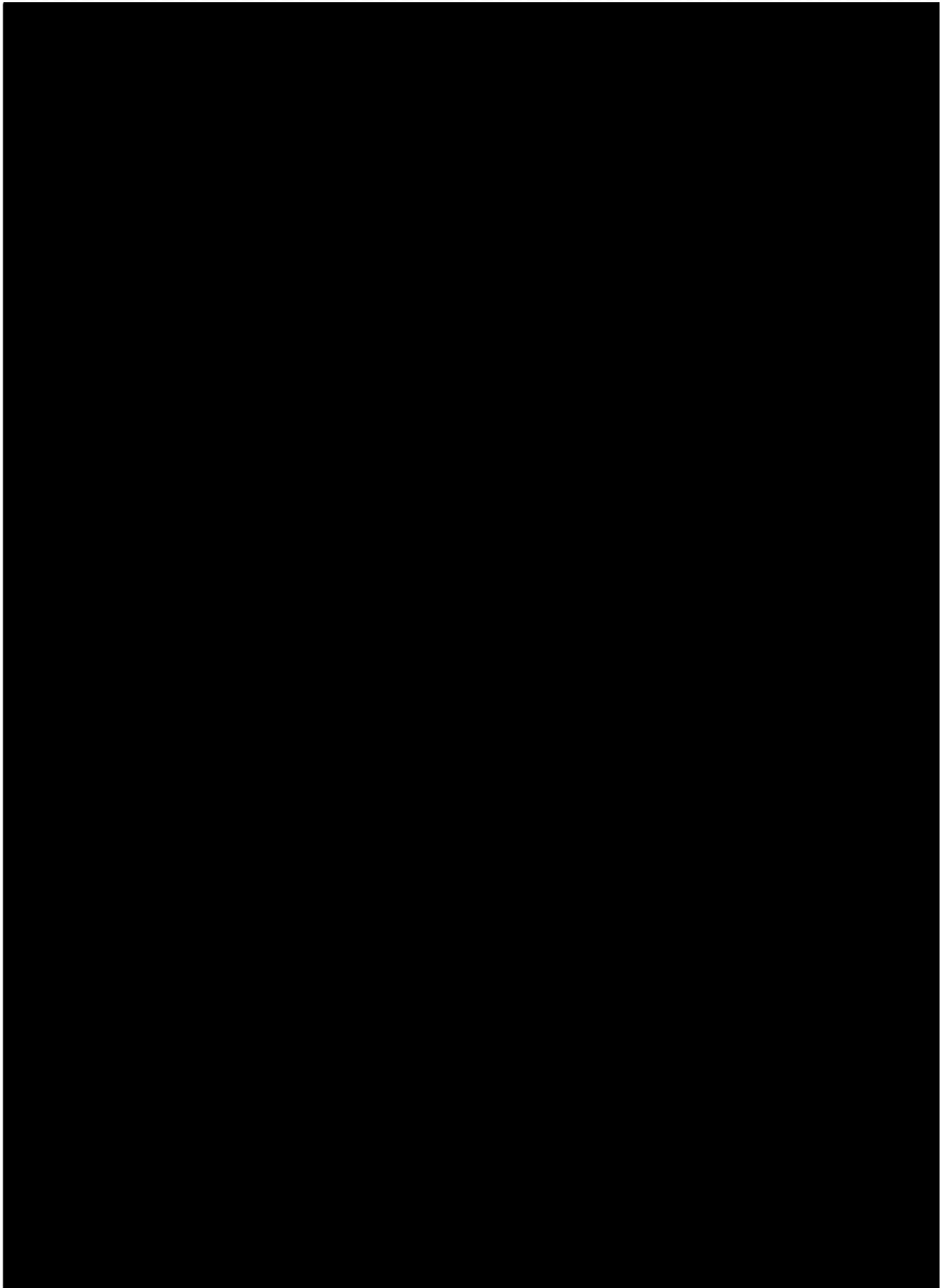


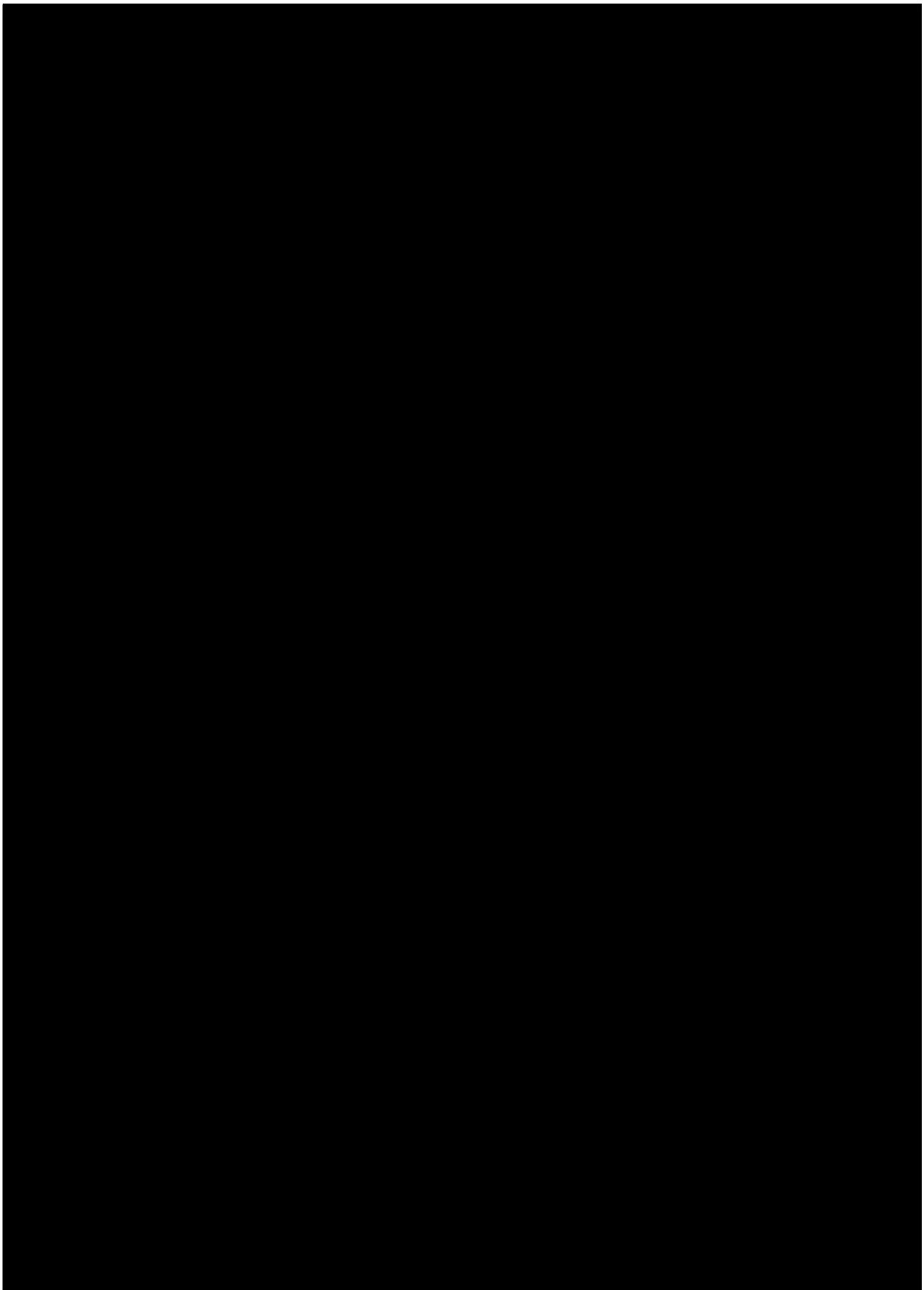


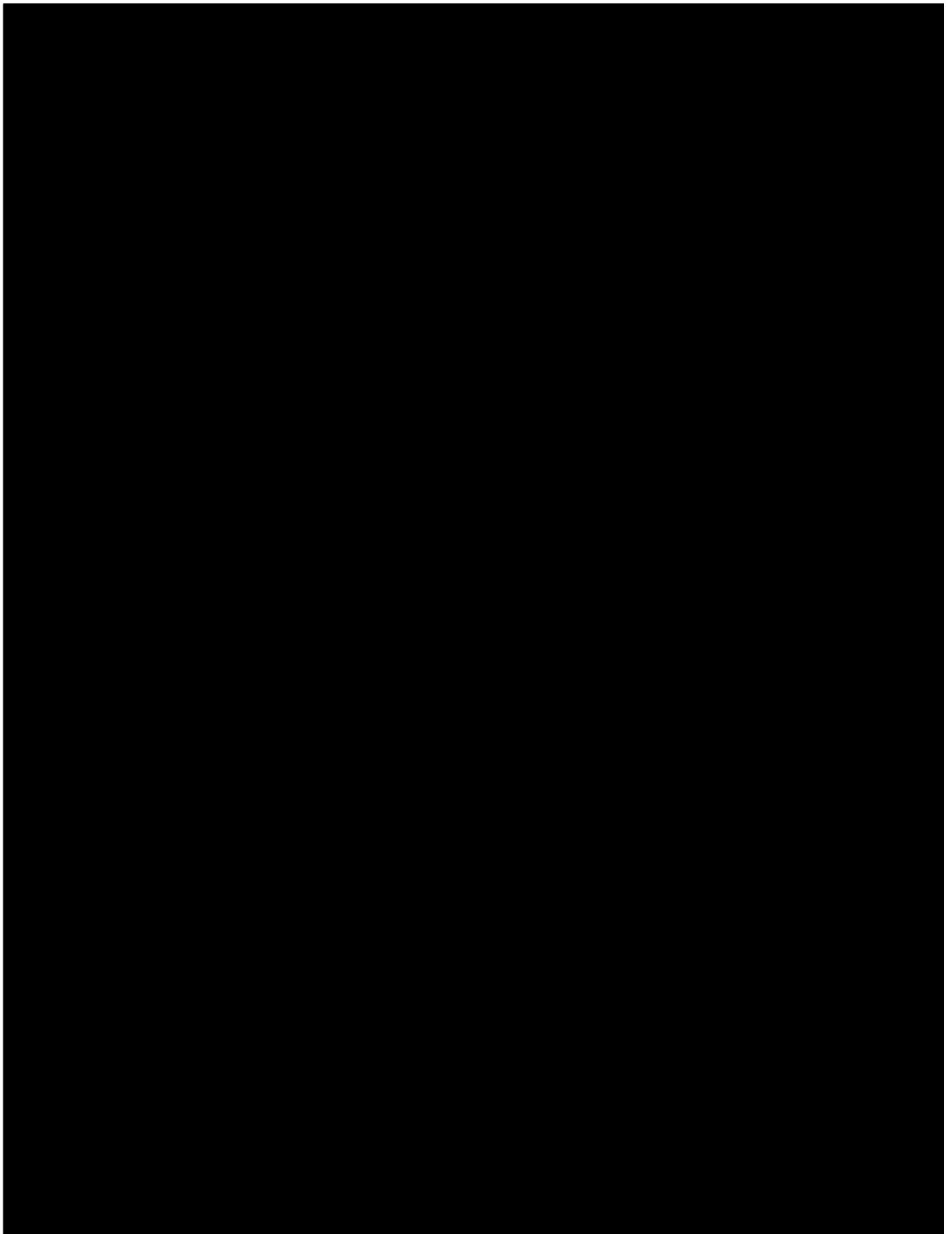


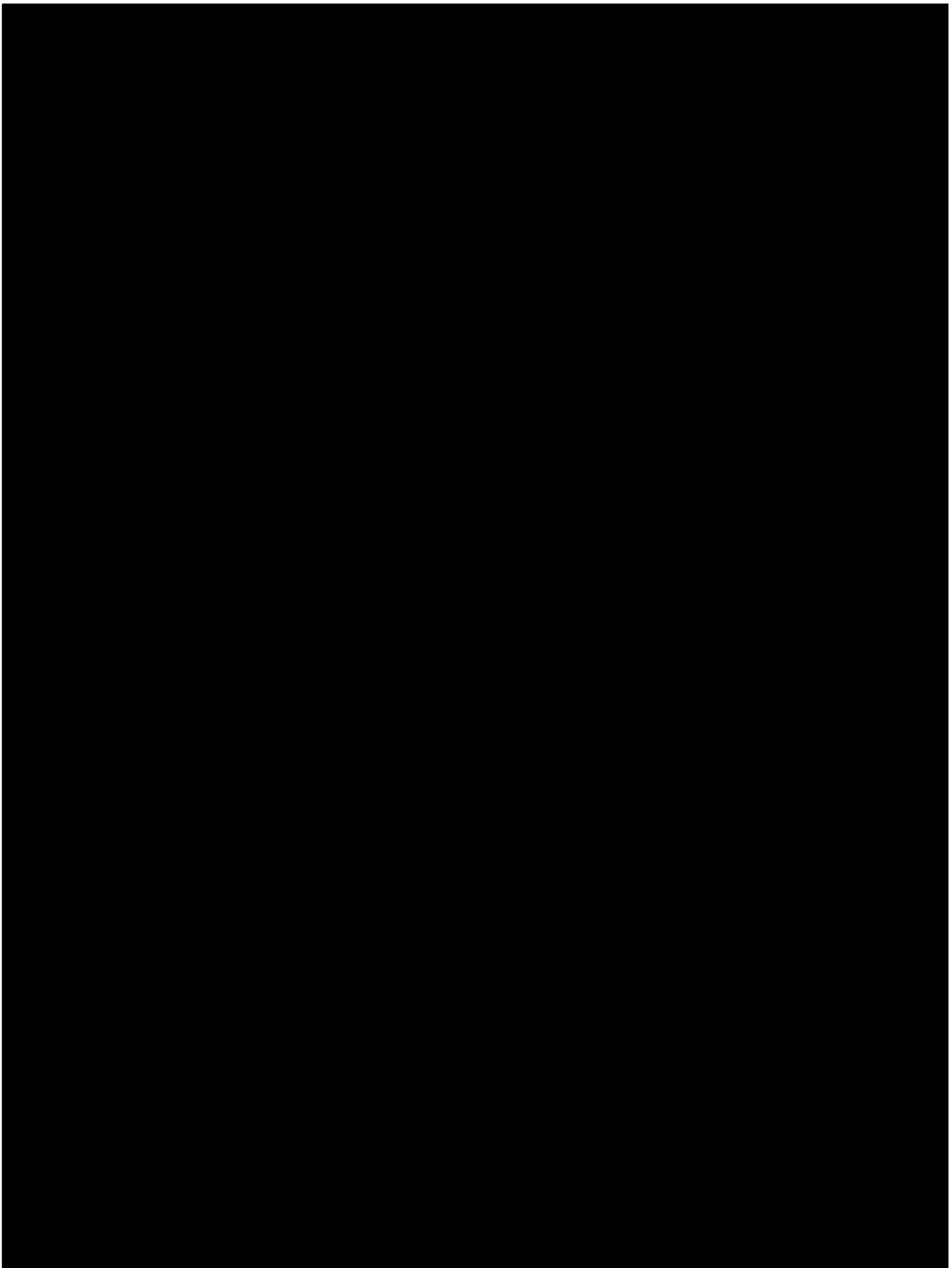


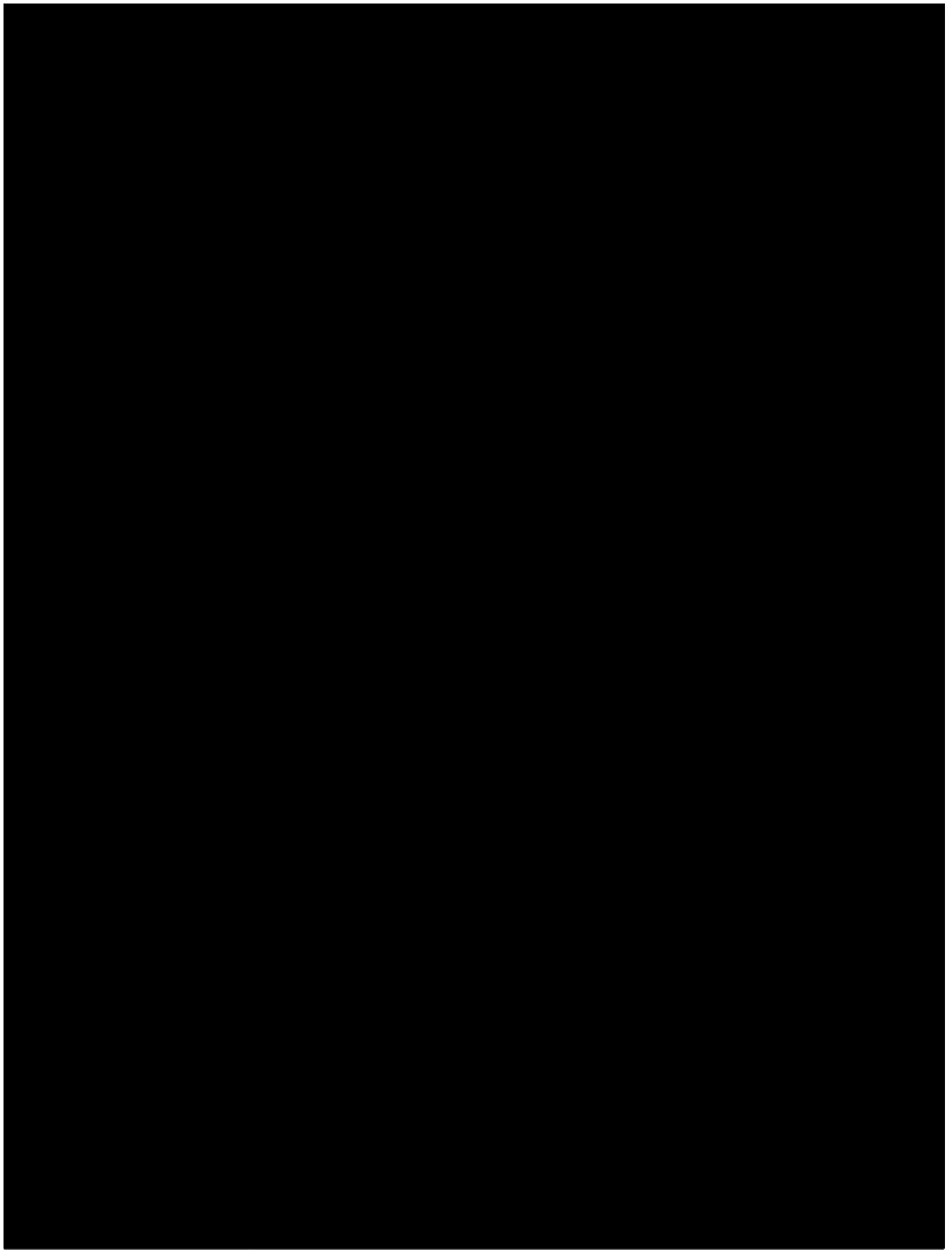


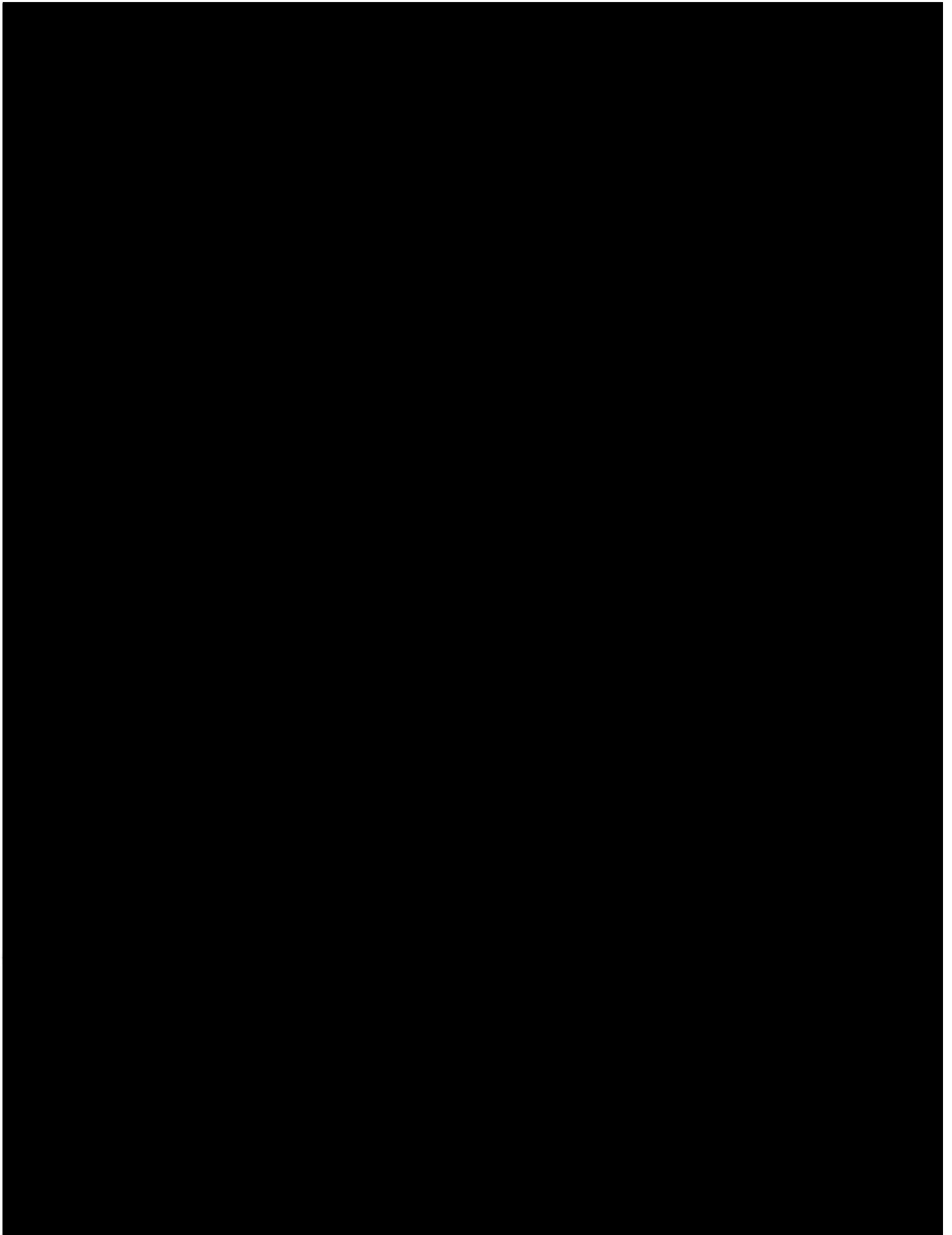


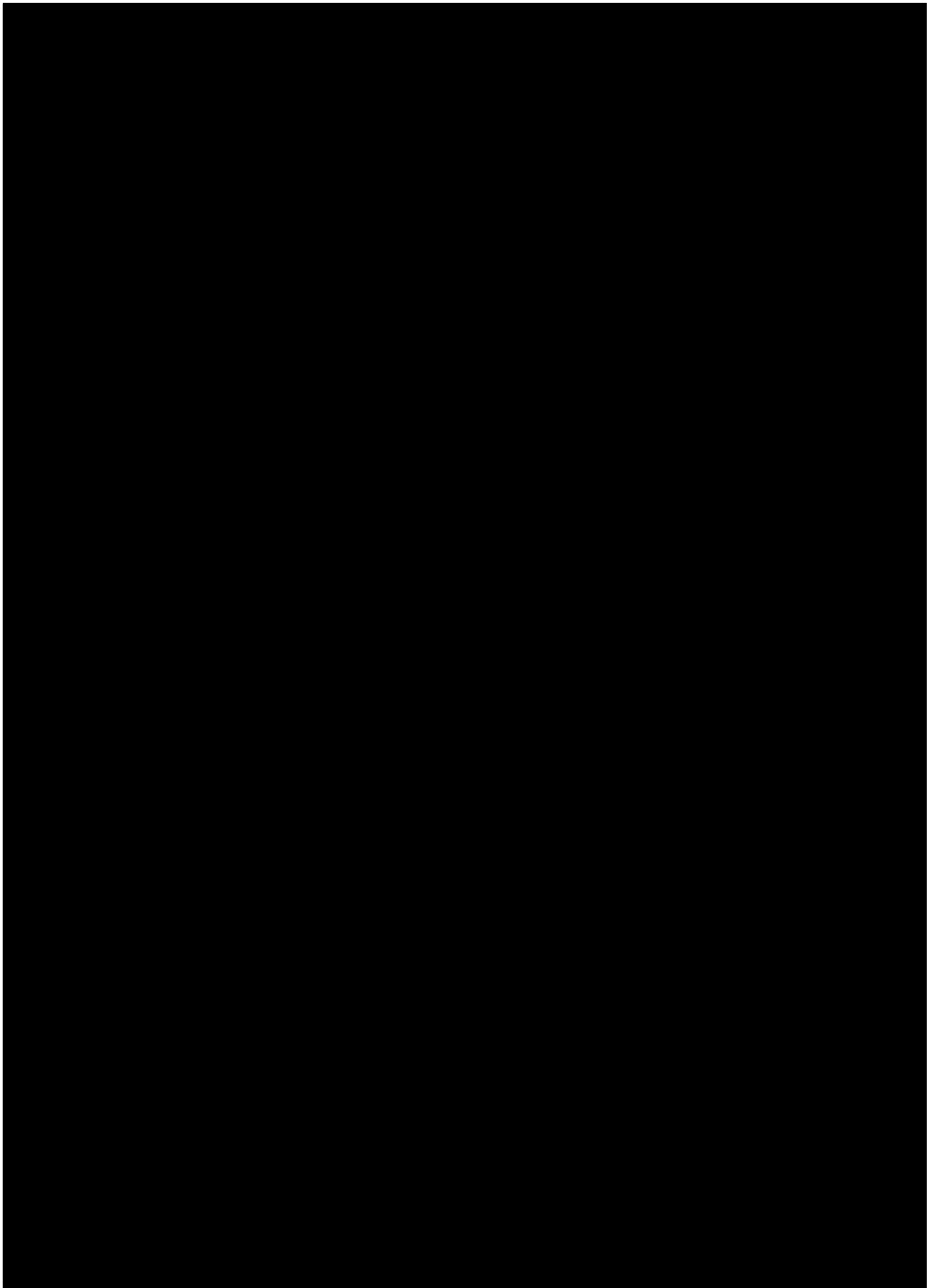


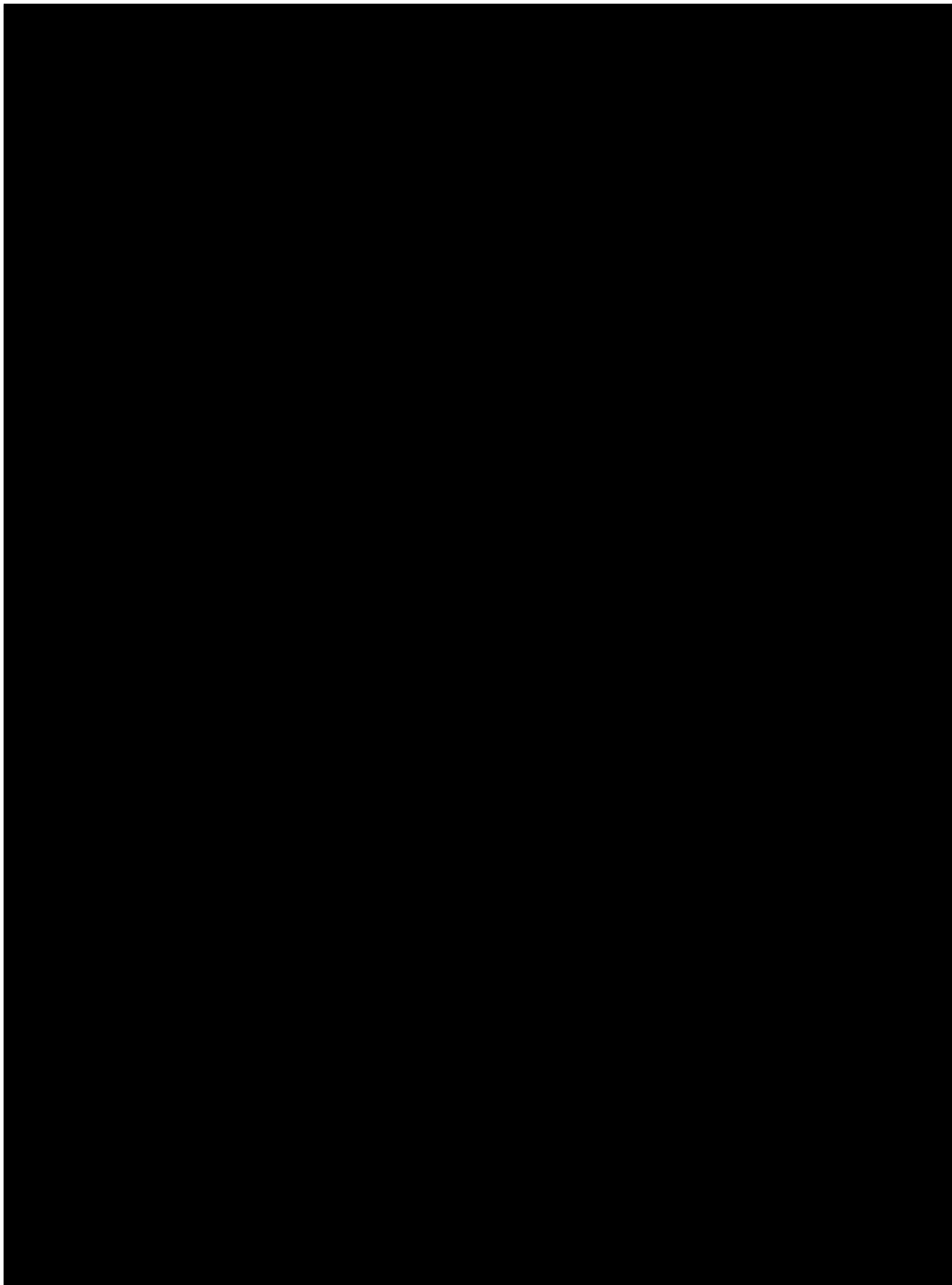


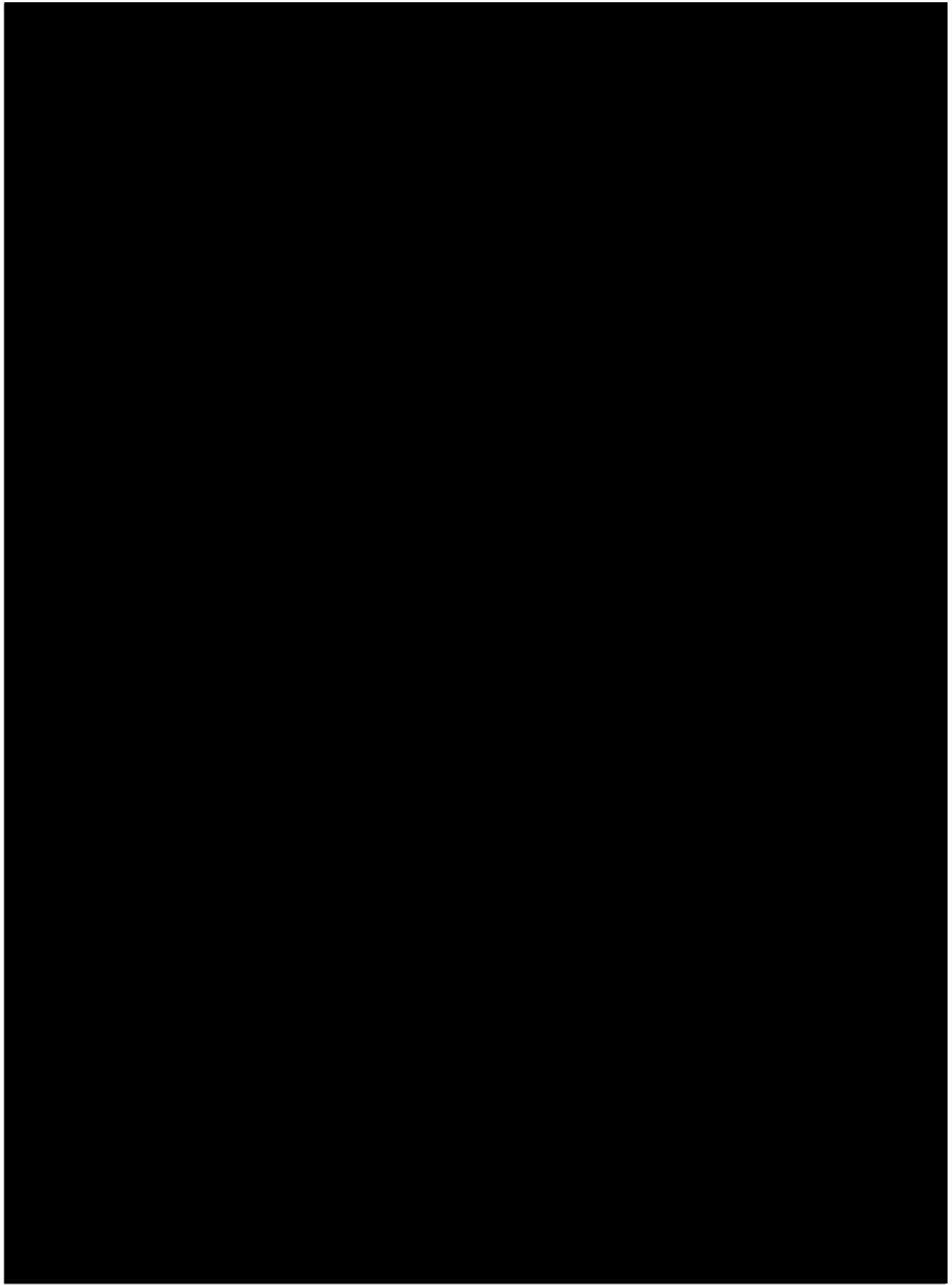


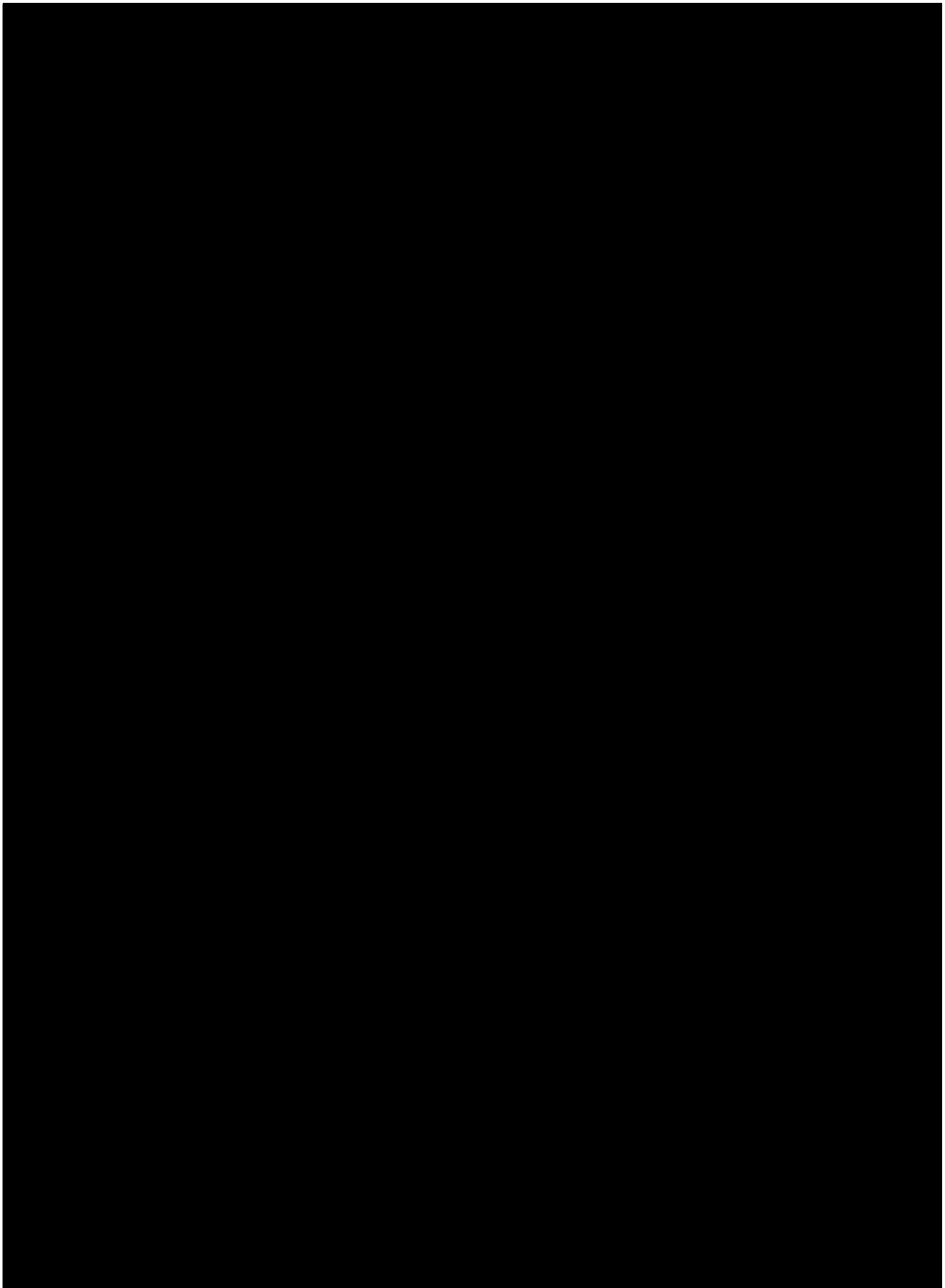


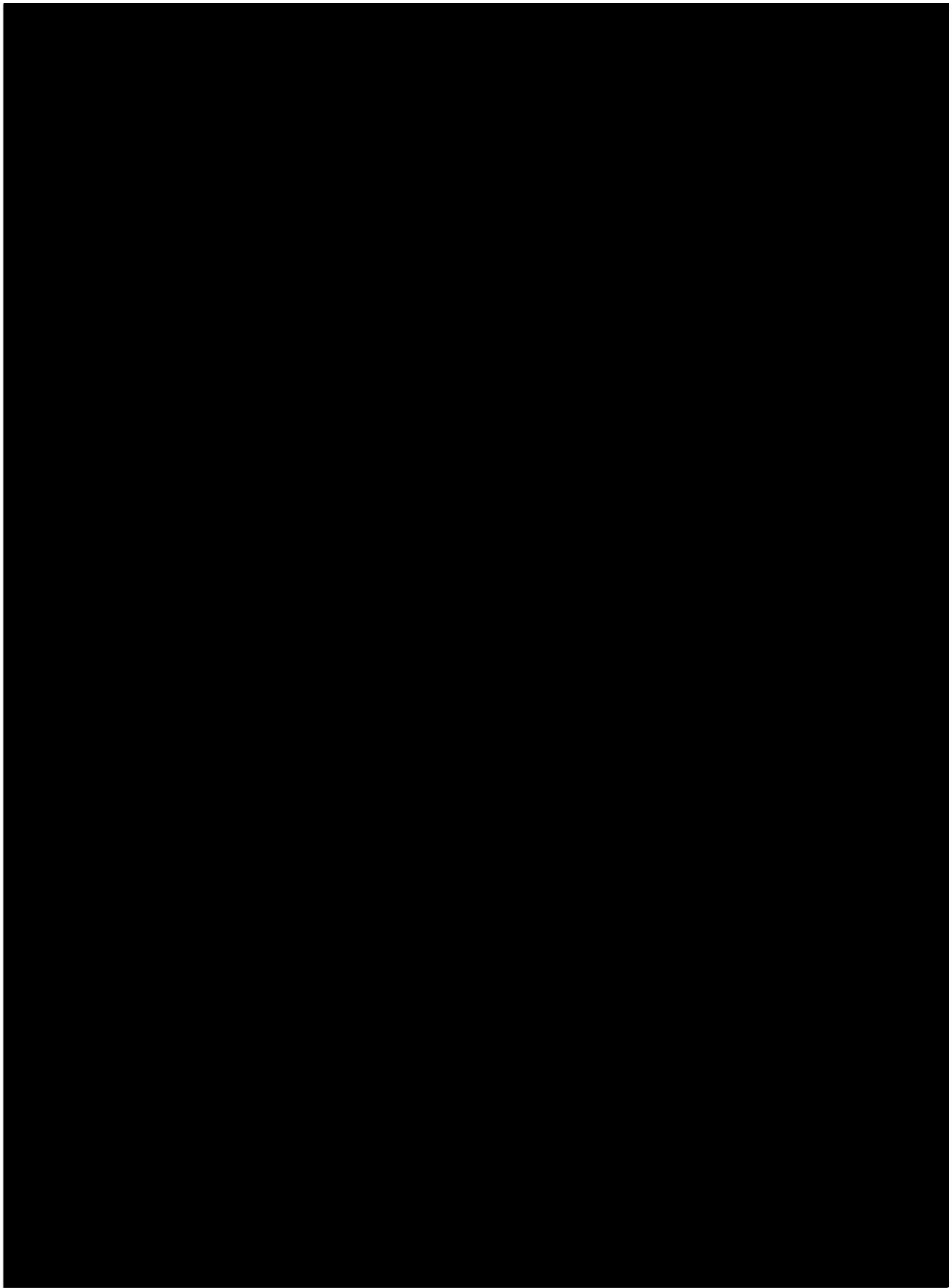


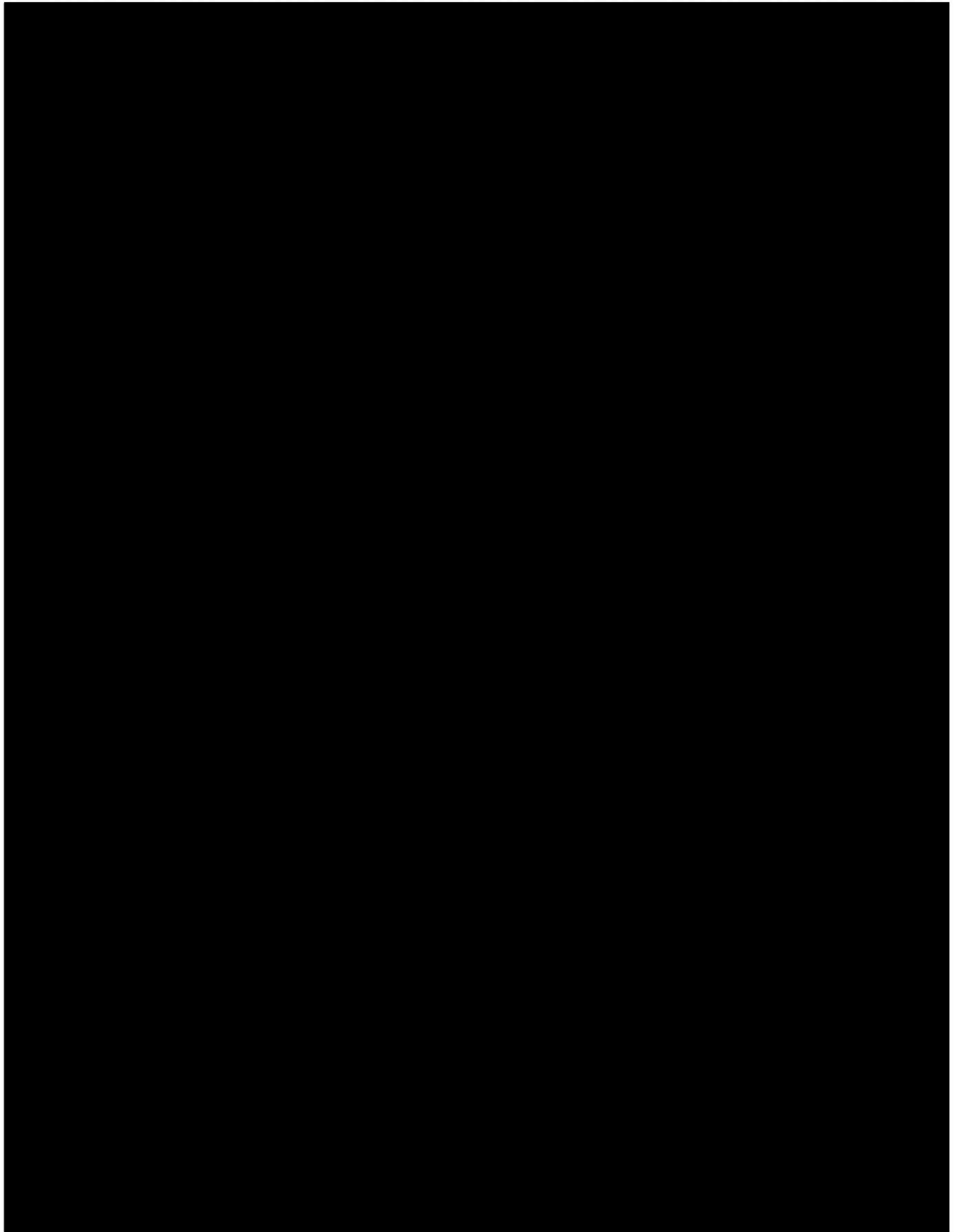


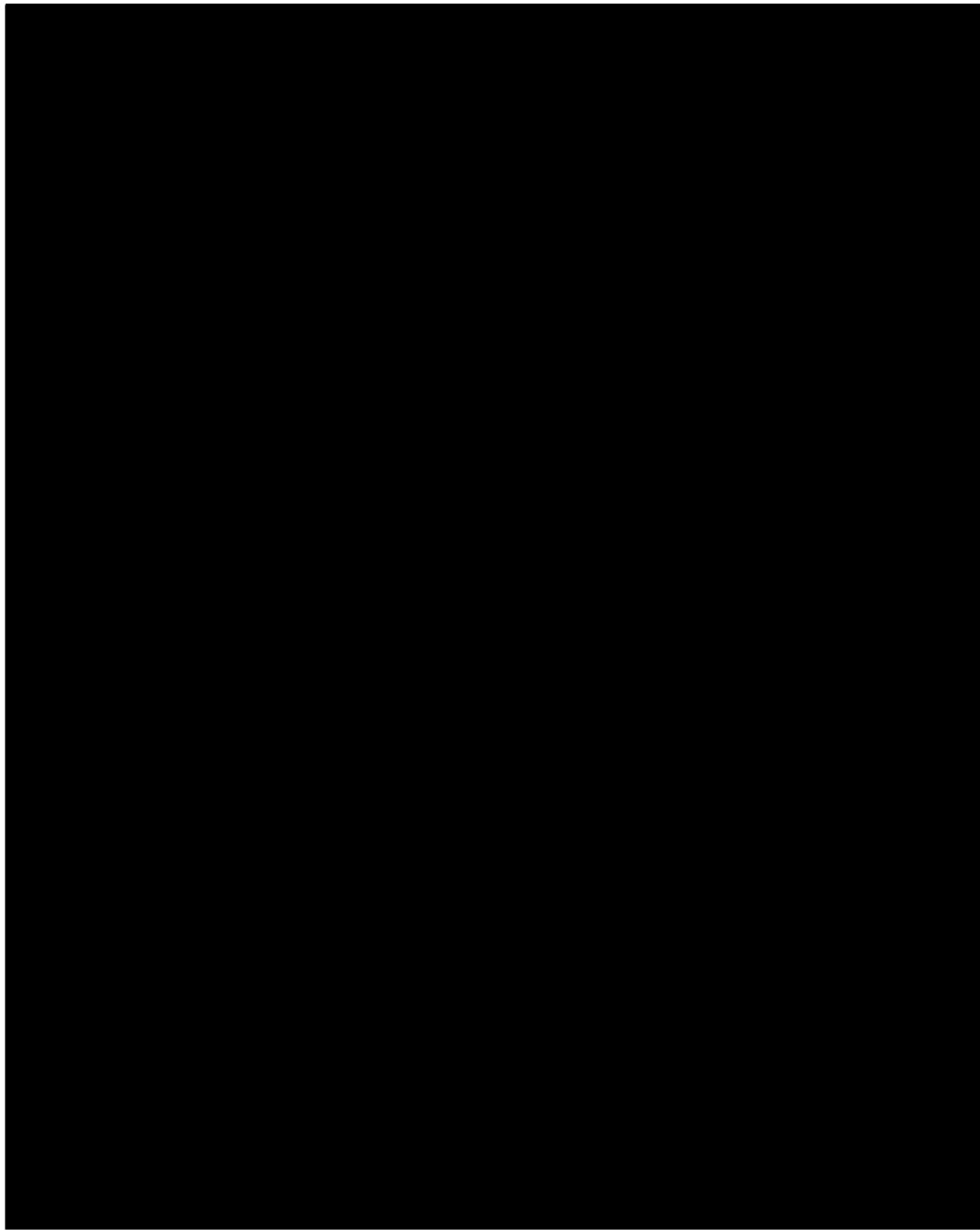












APPENDIX E

ORDINANCE NO. 2018-01

ORDINANCE NO. 2018-01

AN ORDINANCE OF THE CITY OF FRONTENAC, KANSAS, ESTABLISHING RATES AND MINIMUM CHARGES FOR WATER AND SEWER SUPPLIED TO RESIDENCES AND BUSINESSES AND REPEALING ALL PREVIOUS WATER AND SEWER ORDINANCES ESTABLISHING RATES AND MINIMUM CHARGES.

BE IT ORDAINED BY THE GOVERNING BODY OF THE CITY OF FRONTENAC, KANSAS:

Section One.

All prior Ordinances establishing water and sewer rates and charges by the City of Frontenac, Kansas are hereby repealed. Specifically, City of Frontenac Ordinances Numbers 2016-04 and 2017-01 are hereby repealed after January 16, 2018.

Section Two.

For purposes of this Ordinance "utility services" shall be for water and sewer service charges and all applicable and authorized additions and penalties with respect thereto.

Section Three. Billing

All billing for utility services shall be due and payable at the office of the City Clerk of Frontenac, Kansas on the 20th date of each month and must be paid in full by the 23rd day of that month after which date is shall be considered delinquent. A charge of 10 percent penalty will be added to said bill for utility services on the morning of the 23rd day of the month if said bill is unpaid at the close of business on the 22nd day of the month, unless the 22nd day of the month falls on a Sunday or Holiday, in which instance the next regular business day shall apply.

Section Four. Delinquency

A delinquency and termination of written notice shall be issued on the 24th day of the month or next business day if the 24th falls on a Sunday or Holiday, with respect to any delinquent and unpaid utility service bill and said delinquency and termination notice shall provide the customer with the following information, to-wit: (1) the amount due including all applicable penalties and additions with respect to the unpaid utility service bill; (2) notice that service will be terminated and disconnected within 5 days. Such notice shall be deemed sufficient if delivered personally to the utility services customer or placed or posted near the door of the residence or posted in mail, and a \$5.00 notice charge shall then be added to the bill. Termination of service will occur for unpaid account balances of \$10.00 or greater.

Section Five. Establishing Service

Any customer establishing utility services, after the date of enactment of this Ordinance, shall be required to pay a deposit of \$100.00 to be paid to the City of Frontenac. This deposit will be associated with the account for the life of the account. This deposit may be partially refunded, when service is discontinued, after first being applied to a final bill. In the event it is necessary to cut or excavate the street and or alleyway to establish service, the cost shall be Four Hundred Dollars (\$400.00).

Each initial and final bill for a customer will be pro-rated if necessary. No service will be established or re-established at a residence where an individual who has bad debt with the city resides or at a business which they own.

Section Six. Water Rates for Residences and Businesses

The following rates and minimum charges for water service provided to residences and businesses shall be as follows:

**RESIDENCES WITHIN THE
CITY LIMITS OF THE CITY OF
FRONTENAC, KANSAS**

- A) For all water consumed not in excess of two thousand (2,000) gallons per month, the minimum charge shall be \$15.53
- B) For each one hundred (100) gallons per month above the minimum of two thousand (2,000) gallons, the additional charge per hundred (100) gallons shall be \$.50

**RESIDENCES OUTSIDE THE
CITY LIMITS OF THE CITY OF
FRONTENAC, KANSAS**

- C) For all water consumed not in excess of two thousand (2,000) gallons per month, the minimum shall be \$20.48
- D) For each one hundred (100) gallons per month above the minimum of two thousand (2,000) gallons, the additional charge per hundred (100) gallons shall be \$.60

BUSINESSES

- E) For all water consumed not in excess of two thousand (2,000) gallons per month, the minimum shall be \$20.94
- F) For each one hundred (100) gallons per month above the minimum of two thousand (2,000) gallons, the additional charge per hundred (100) gallons shall be \$.55

Section Seven. Water Fees

On and after the effective date of the Ordinance, the following charges shall be assessed:

- A) For all new meters installed, there shall be a \$300.00 service charge, plus materials and labor costs for the installment of said meter.
- B) A disconnection-reconnection fee of \$70.00 shall be applied when it becomes necessary due to non-payment or untimely payment.
- C) In addition to the above one-time meter charges, there shall be a monthly charge of \$6.83 per meter with said fees generated to be placed in the water utility fund.
- D) All customers will pay a monthly \$.25 Water Protection Fee. This fee is charged to the City of Frontenac by the State of Kansas.

Section Eight. Infrastructure Improvement Funding

To finance infrastructure improvements, the following rate increases are approved for future fiscal years:

FY2019	Water – 13%	Sewer – 10%
FY2020	Water – 11 %	Sewer – 8%
FY2021	Water – 9%	Sewer – 8%

Section Nine. Sewer Rates

Sewer rates are averaged based upon the water usage for the months of November, December, and January. If a customer feels this average does not accurately reflect their normal usage, a request can be made to recalculate usage based upon different months which staff believe reflect “normal usage”. New customers are charged for services based upon monthly water usage until it is possible to calculate an average for the months of November, December, and January.

On and after the effective date of the Ordinance, the sewer charges shall be:

RESIDENCES AND BUSINESSES

- A) Minimum charge for a sewer per month shall be \$18.44* for the first two thousand (2,000) gallons of water used.
- B) For each one hundred (100) gallons per months, above the minimum of two thousand (2,000) gallons, the additional charge per hundred (100) gallons shall be \$.35*

For the purpose of this section each resident, multi-family residence, mobile home, apartment, motel/hotel, rooming house, or institution shall be assessed the minimum charge for sewer per month per each unit.

*These rate increases are included as part of the Fiscal Sustainability Plan developed by Kramer Consulting, LLC, required by KDHE, and approved by the Frontenac City Council in 2017.

Section Ten. Sewer Tap Fee, Miscellaneous Provisions, and Storm Water Fee.

- a. The City shall establish a sewer tap fee of Two Hundred Dollars (\$200.00) for a standard main sewer tap. In the event it is necessary to cut or excavate the street and or alleyway then the cost shall be Four Hundred Dollars (\$400.00). The City requires that all new and replacement sewer taps be performed by a licensed plumber and the City reserves the right to inspect the same. The City of Frontenac is not responsible for sewer taps, the sewer taps remain the responsibility of the property owner.
- b. The City will assess each customer a monthly \$1.00 Storm Water Fee. The fee’s purpose is to provide funding for drainage improvements within the City.

Section Eleven. Abnormal Utility Usage

- a. When a *non-visible* leak occurs at a residence or business, a customer may request an adjustment one (1) time per twelve-month period. The leak must be documented as *non-visible* by a licensed plumber or city employee. An average water consumption total for the (3) three months of preceding will be utilized to obtain a base upon which the user charge will be computed.

Section Twelve. Collection Fees

The City of Frontenac reserves the right to assess against any customer the costs associated with the collection of any unpaid balance, including those charges and fees which may be assessed by a collection agency utilized by the City.

Any customer with a returned check will be required to pay a \$30.00 returned check fee. If a termination of service has occurred on an account a returned check, a \$70.00 disconnection-reconnection fee must be paid simultaneously with the \$30.00 returned check fee in order for service to be re-established.

Section Thirteen. Conjoining the requirement for both water and sewer services

- A) Owners of premises served by water and sewer service under this ordinance shall be liable for payment of the cost of such service account delinquency arising from services provided to such premises, regardless of whether such services were furnished upon the application and request of the owner or the lessee of the premises.

Owners or the lessee of premises which are occupied and to which water and sewer service are available are required to hookup to both the City's water and sewer systems and use such systems for their designed use and purpose. This requirement applies both to residential and commercial properties. This provision shall also apply when the premises are leased by or through an agent or other representative of the owner.

- B) Owners of leased premises served by water and sewer service furnished by the City shall be ultimately liable for payment of the cost of any such service furnished by the City to such leased premises, whether the services are furnished upon the application and request of the owner or the lessee of such premises.
- C) If water and sewer services are furnished by the City to leased premises, upon the application and request of the lessee, then all billings for such service furnished shall be made to the lessee. However, if the cost of such service is not paid, as and when they become payable, the owner of the premises served shall be liable for the payment of such cost, plus all interest and penalties as provided by the laws of the City. The owner shall be notified in writing by first class mail within 10 days after a billing becomes delinquent.
- D) If water and sewer services are furnished to leased premises on the application and request of the lessor of the premises, then all billings for such service furnished to such leased premises shall be made directly to the owner, and the owner shall be fully liable for the cost of service furnished.

Section Fourteen. Enforcement.

- A) Any person found to be violating any provision of this ordinance shall be served by the City with written notice stating the nature of the violation and providing a reasonable time limit for the satisfactory correction thereof. The offender shall, within the period of time stated in such notice, permanently cease all violations.
- B) Any person violating any of the provisions of this ordinance shall become liable to the City for any expense, loss, or damage occasioned the City by reason of such violation.

Section Fifteen. Effective Date.

This Ordinance shall take full force and effect on the 15th day of February, 2018, provided a summary has been published one time in the official city newspaper. The ordinance may be viewed in its entirety on the City's website.

ADOPTED by the governing body of the City of Frontenac, Kansas, on January 16, 2018 and signed by the Mayor.

Linda K. Grilz, Mayor

(SEAL)
ATTEST:

Monica R. Kellogg, City Clerk

APPENDIX F

EPA FACTS ABOUT RADIUM



EPA Facts about Radium

What is radium?

Radium is a naturally occurring radioactive metal that exists as one of several isotopes. It is formed when uranium and thorium decay in the environment. In the natural environment, radium is found at low levels in soil, water, rocks, coal, plants, and food.

What are the uses of Radium?

In the early 1900s, radium was wrongly used to treat rheumatism and mental disorders and as a general tonic. Radium was also used to make luminous paints for watch dials, clocks, glow in the dark buttons, and military instruments. The use of radium for these purposes was discontinued because of the health hazards from these types of exposures. Radium has also been widely used in radiation treatment of cancer, but this use has largely been replaced by other radioactive materials or methods. Radium-226 has also been used in medical equipment, gauges, and calibrators, and in lightning rods. Alpha emitters such as radium and plutonium can be used as components of a neutron generator.

How does radium change in the environment?

Radium is not a stable element. As radium decays, it releases radiation and forms decay products. Like radium, many of these decay products also release radiation and form other elements. The decay process continues until a stable, nonradioactive decay product is formed.

Radiation is released during the decay process in the form of alpha particles, beta particles, and gamma radiation. Alpha particles can travel only short distances and cannot penetrate human skin. Beta particles are generally absorbed in the skin and do not pass through the entire body. Gamma radiation, however, can penetrate the body.

Isotopes of radium decay to form radioactive isotopes of radon gas. The time required for a radioactive substance to lose 50 percent of its radioactivity by decay is known as the half-life. The half lives are 3.5 days for radium-224, 1,600 years for radium-226, and 6.7 years for radium-228, the most common isotopes of radium, after which each forms an isotope of radon. Radon is known to accumulate in homes and buildings.

How are people exposed to radium?

Since radium is present at relatively low levels in the natural environment, everyone has some level of exposure from it. However, individuals may be exposed to higher levels of radium and its associated external gamma radiation if they live in an area where there is an elevated level of radium in soil. In addition, radium is particularly hazardous because it continuously produces radon, which can diffuse into nearby homes.

An individual can be exposed to radium through contact with waste from ore at former radium processing facilities, former radium dial facilities, or radium dials. In addition, exposure to radium can occur if radium is released into the air from burning coal or other fuels, or if drinking water

taken from a source that is high in natural radium is used. Individuals may also be exposed to higher levels of radium if they work in a mine or in a plant that processes ores. Phosphate rocks, which can contain relatively high levels of uranium and radium, are also a potential source of exposure. The concentration of radium in drinking water is generally low, but there are specific geographic regions in the United States where higher concentrations of radium may occur as a result of geologic sources.

Radium exposure therefore can be from gamma radiation from radium decay products, lung exposure from radon gas and its decay products, and inhalation and ingestion exposure.

How does radium get into the body?

Radium can enter the body when it is inhaled or swallowed. Radium breathed into the lungs may remain there for months; but it will gradually enter the blood stream and be carried to all parts of the body, with a portion accumulating in the bones.

If radium is swallowed in water or with food, most of it (about 80 percent) will promptly leave the body in the feces. The other 20 percent will enter the blood stream and be carried to all parts of the body. Some of this radium will then be excreted in the feces and urine on a daily basis; however, a portion will remain in the bones throughout the person's lifetime.

Is there a medical test to determine exposure to radium?

Urinalysis and bone biopsy tests are sometimes used to determine if individuals have ingested a source of radioactivity such as radium. Radon, a

decay product of radium, can also be measured in air that is exhaled from the body. Another technique, gamma spectroscopy, can measure the amount of radioactivity in portions of the body. These tests require special equipment and cannot be done in a doctor's office. There is no test that can detect external exposure to radium's gamma radiation alone.

How can radium affect people's health?

Exposure to radium over a long period may result in many different harmful effects. If inhaled as dust or ingested as a contaminant, risk is increased for several diseases, including lymphoma, bone cancer, and hematopoietic (blood-formation) diseases, such as leukemia and aplastic anemia. These effects take years to develop. If exposed externally to radium's gamma radiation, risk of cancer is increased in essentially all tissues and organs, though to varying degrees. However, in the environment, the greatest risk associated with radium is actually posed by its direct decay product radon. Radon has been shown to cause lung cancer.

What recommendations has the U.S. Environmental Protection Agency made to protect human health?

Please note that the information in this section is limited to recommendations EPA has made to protect human health from exposure to radium. General recommendations EPA has made to protect human health at Superfund sites (the 10^{-4} to 10^{-6} cancer risk range), which cover all radionuclides including radium, are summarized in the fact sheet "Primer on Radionuclides Commonly Found at Superfund Sites."

For uranium mill tailing sites with radium contamination, EPA has established a radium level of 5 picoCuries per gram (pCi/g) above background as a protective health-based level for cleanup of soil in the top 15 centimeters. These regulations under 40 Code of Federal Regulations (CFR) Part 192.12 are often Applicable or Relevant and Appropriate Requirements (ARARs) at Superfund sites. The EPA document “Use of Soil Cleanup Criteria in 40 CFR Part 192 as Remediation Goals for CERCLA Sites” provides guidance to EPA staff regarding when the use of 5 picoCuries per gram (pCi/g) is an ARAR or otherwise recommended cleanup level for any 15 centimeters of subsurface radium-contaminated soil other than the first 15 centimeters. This document is available online at:

<http://www.epa.gov/superfund/health/contaminants/radiation/pdfs/umtrcagu.pdf>.

If regulations under 40 CFR Part 192.12 are an ARAR for radium in soil at a Superfund site, then Nuclear Regulatory Commission regulations for uranium mill tailing sites under 10 CFR Part 40 Appendix A, I, Criterion 6(6), may be an ARAR at the same site. Criterion 6(6) requires that the level of radiation, called a “benchmark dose,” that an individual would receive be estimated after that site was cleaned up to the radium soil regulations under 40 CFR Part 192.12. This benchmark dose then becomes the maximum level of radiation that an individual may be exposed to from all radionuclides, except radon, in both the soil and buildings at the site. The EPA document “Remediation Goals for Radioactively Contaminated CERCLA Sites Using the Benchmark Dose Cleanup Criterion 10 CFR Part 40 Appendix A, I, Criterion 6(6)” provides

guidance to EPA staff regarding how Criterion 6(6) should be implemented as an ARAR at Superfund sites, including using a radium soil cleanup level of 5 pCi/g in both the surface and subsurface in estimating a benchmark dose. This document is available online at:

<http://www.epa.gov/superfund/health/contaminants/radiation/pdfs/part40.pdf>.

EPA has established a Maximum Contaminant Level (MCL) of 5 picoCuries per liter (pCi/L) for any combination of radium-226 and radium-228 in drinking water. EPA has also established a MCL of 15 pCi/L for alpha particle activity, excluding radon and uranium, in drinking water. Radium-226 is covered under this MCL.

For more information about how EPA addresses radium at Superfund sites

Contact Stuart Walker of EPA:

(703) 603-8748 or walker.stuart@epa.gov,

or visit EPA’s Superfund Radiation Webpage:

<http://www.epa.gov/superfund/resources/radiation/>

APPENDIX G

ENVIRONMENTAL REPORT WITH RESPONSES
INCLUDING
ORIGINAL WASTE STREAM DISPOSAL REPORT APPROVED BY KDHE
ON MAY 16, 2016

KRAMER CONSULTING, LLC
Engineers - Planners - Surveyors

ENVIRONMENTAL REPORT

WATER SUPPLY, STORAGE AND TREATMENT IMPROVEMENTS

for

City of Frontenac, Kansas



ENVIRONMENTAL REPORT

WATER SUPPLY, STORAGE AND TREATMENT IMPROVEMENTS

for

City of Frontenac, Kansas



John P. "Jack" Kramer; P.E., P.S.
Principal

Josh B. Kramer, E.I.T.

Job No. 1622

February 13, 2017 (Rev. March 1, 2017)

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Section 1.0

Purpose and Need for the Proposal

1.1 Project Description – Proposed Action

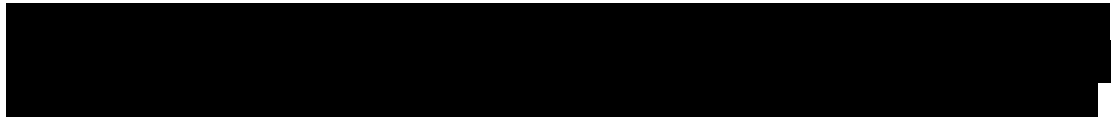
The City of Frontenac, Kansas (City) proposes to make improvements to their existing public water supply system, which includes the addition of a new water supply well, water treatment facility upgrades, improvements, odor removal and a new water tower, with intent of continuance of supplying water to their users that meets the State of Kansas drinking water regulations and standards.



In order for the City to provide quality water throughout the design period, the water treatment facility needs to be updated and improved. The improvements for the water treatment facility are listed herein.

A new water tower is proposed to be installed in order to replace an outdated water tower that is in need of replacement or substantial repair. The new water tower would be placed at a vacant area near the City's ball diamond where the City own's land.

The following lists the preliminary design of the improvements for the City's water improvements.



[REDACTED]

[REDACTED]

2. Water Treatment

Upgrading the water treatment plant and adding an H₂S Air Scrubber unit is the recommended improvements for water treatment.

The present treatment plant is designed to operate up to 1,050 gpm and is presently being operated at 700 gpm.

Principal items recommended for upgrading water treatment plant and odor removal are listed as follows:

[REDACTED]

3. Water Distribution System

The City has completed water replacement projects as necessary in 2010, therefore no improvements to the water distribution system are needed or recommended at this time.

4. Water Storage

A 250,000 gallon pedesphere elevated water storage tank is the recommended alternative to provide the additional water storage needed to supply a two-day average water use.

The new water storage tank is to be constructed on land Frontenac owns, northeast of the water treatment plant in the area between a ball diamond and adjacent to the northwest corner of a parking lot. The tank will have a reinforced concrete foundation, single steel pedestal and 250,000 gallon tank with 100 foot height to the low water line.

1.2 Purpose and Need of the Proposal

One major need for the project is to protect the health, sanitation and security of the water system. Listed below are the four components of the City's public water supply system.

1. Water Supply

Frontenac's well water is safe to drink with treatment for hydrogen sulfide removal and disinfection. The current water treatment plant removes hydrogen sulfide and provides filtration and disinfection.

2. Water Treatment

Improvements and replacement of failing water treatment plant equipment, filter media, controls and plant items that need upgraded are required to provide safe water treatment. Adequate fencing and alarm system are needed to provide security for the water plant and well supplies. Hydrogen sulfide (H₂S) odor control unit is needed to remove the H₂S gas from the aerators exhaust discharge air stream. The H₂S gas smell from the aerators is very obnoxious and unpleasant. The City continues to receive complaints about this odor. A new waste stream will be generated by the H₂S control unit and it is proposed to send the new waste stream to the filter backwash waste sump for disposal along with the existing process wastewater streams. The proposed method of disposal was in principle accepted by KDHE based on the agreed upon consensus outcome of the formally completed waste stream summary review and disposal method consensus process.

3. Water Distribution System

The water distribution system provides adequate flows for recommended fire protection and safe delivery of water to users. No improvements to the water system are needed at this time.

3. Water Storage

The existing 75,000 gallon elevated water storage tank was constructed in 1907. An April 2006 inspection of this tank indicated that interior and exterior painting is needed and extensive tank repairs are required, especially to the roof. Also, modifications are required to bring the tank into compliance with current paint and safety standards. The tank needs to be replaced to provide for safe and sanitary water storage.

Another major need for the project is due to the age of the infrastructure. Listed below is the breakdown of the aging infrastructure.

[REDACTED]

[REDACTED]

[REDACTED]

2. Water Plant

The water treatment plant has been in operation for over 24 years. Items needing to be replaced due to age and needed for upgrade are shown in the Preliminary Engineering Report in Section II, Page II-14. Improvements and replacement of certain items in the water treatment plant are needed to provide safe water treatment to meet EPA and KDHE water quality standards. With improvements, the water plant would be suitable for use through the design year of 2035, based on present State and Federal regulations.

3. Water Storage

The 75,000 gallon elevated water storage tank at the treatment plant site is over 110 years old and needs replaced. Due to aging, the storage tank and supporting structure are in very poor condition; need major repairs and removal of lead base paint. It is not economically feasible to repair this tank due to age of the tank and cost for repairs.

The tank is considered unsafe and not suitable for continued use through the design period.

Another need for the project is based on growth in the City of Frontenac. There has been a steady growth in population served and water demands for water in the planning area served by Frontenac's water facilities.

1. Future Demands for Water

In order to establish reasonable design criteria for the various components of the water distribution system, storage, supply and treatment plant, it is necessary to establish present and estimate the future demands for water. "Demands for Water" is defined as the sum total of the requirements of all the consumers served by the water utility, which includes residential, business and also all leakages, municipal uses and firefighting requirements. It is the obligation of the water utility to supply this demand at all times without restraint or restriction.

There are so many factors affecting water demands that an exact projection of future water use is impossible. Some of the factors affecting water use are changes in population, quality and quantity of water available, weather conditions, cost of water, economic and agricultural conditions and water conservation measures. However, using population and past water use data, a reasonable projection of future water use can be made for facilities design and operational costs.

Should the City experience a large industrial growth or a larger increase in population than projected, it may be necessary to expand the municipal water system beyond those improvements planned herein. The initial construction and proposed improvements as outlined in later parts of this report include a reasonable capacity that will provide time for expansion of the plant if greater demands than anticipated now are encountered in the future.

Water use during the last 5 years in Frontenac, based on water sold, has ranged between 74 and 85 gallons per capita per day (gpcd); whereas per capita water treated has ranged from 93 to 103 gallons per capita per day.

The maximum water production month during the last five year period was 13,670,000 gallons in August 2012. This calculates to be an average of 440,970 gallons per day and the peak is likely to be 1.9 times the average day for the maximum month, or 837,840 gallons for the maximum day.

Based on water production during the last five year period, 331,340 gallons per day is the average water production per day. Free water is water used at ball diamonds, water plant and flushing fire hydrants.

It is recommended the City plans on supplying an average of 90 gpcd for water sold and 125 gpcd for water treated through design year 2035. The water treated amount is based on the City keeping water loss below 15%, which has been achieved for the last 5 years.

This increase in meters will allow for future growth, while still remaining a conservative estimate. The existing number of water meters served by Frontenac, and the projected number to be served in the design year of 2035 are shown in Table III-1. While the City's projected population is expected to increase 13% over the design period, this study will assume a 10% increase in the number of meters served by year 2035.

Table III-1					
Water Meters, Present and Design					
<i>Year</i>	<i>Residential</i>	<i>Commercial*</i>	<i>Pasture</i>	<i>City**</i>	<i>Total</i>
2015	1,433	93	19	16	1,561
2035	1,576	102	21	18	1,717

*Includes 2 high water users

**City meters receive free water and includes 4 meters at cemeteries

The projected new water use for Frontenac for 2035 is 177.0 million gallons per year. The City has current water rights from all three wells together for up to 188.5 million gallons per year. Also, the water right allows diversion from the wells at a rate not to exceed 711 gallons per minute.

Based on past water use data and for cities the size of Frontenac, data and experience has shown that the maximum day usage ranges between 180 to 200 percent of the average day demand during maximum use month. Therefore, the maximum day demand for water for Frontenac has been estimated to be 190% of the average day demand, or 942,200 gallons in design year 2035.

The maximum hourly, instantaneous and fire flows will be provided by the City's water storage tank, water distribution system and water from the treatment facilities.

By replacing and/or upgrading existing aging water supply, treatment facilities and water storage, the water utility will be sustainable to meet the planning area needs through the design year 2035.

* * * * *

The first part of the paper discusses the importance of the research and the objectives of the study. It then presents a literature review of the existing research on the topic. The next section describes the methodology used in the study, including the data sources and the statistical techniques employed. The results of the study are then presented, followed by a discussion of the findings and their implications. The paper concludes with a summary of the main points and suggestions for further research.

The study was conducted using a quantitative research design. Data was collected from a sample of 100 participants, who were selected using a random sampling method. The data was then analyzed using a series of statistical tests, including t-tests, ANOVA, and regression analysis. The results of the study show that there is a significant difference between the two groups, with the first group performing better than the second group. This finding is consistent with the previous research, which has also shown that the first group is more effective than the second group.

The implications of the study are that the first group is more effective than the second group, and that the results of the study can be used to inform the development of new interventions. The study also has some limitations, including the small sample size and the lack of a control group. Future research should aim to address these limitations and to further explore the effectiveness of the first group.

In conclusion, the study has shown that the first group is more effective than the second group, and that the results of the study can be used to inform the development of new interventions. The study also has some limitations, including the small sample size and the lack of a control group. Future research should aim to address these limitations and to further explore the effectiveness of the first group.

Section 2.0

Alternatives to the Proposed Action

2.1 Alternatives Considered

During the engineering study phase of this project, many alternatives were considered and discussed with the City staff in order to design the most cost effective project, while still keeping the environment, public health and safety at the highest priority.

Listed below are the most economical and feasible alternatives considered for the project.

1. Water Supply and Treatment

a. Sharing Services

Frontenac has had talks with the City of Pittsburg about sharing water services. However, each City has their own suitable and adequate supply and it was not practical for either City to provide water for both cities or abandon their present water service. The City of Frontenac provides water to RWD No. 1, Crawford County through an emergency connection. When necessary, the water district is able to obtain water from the City.

In the past, Frontenac contracted to supply water and maintain the water system in the Capaldo area. The City has now annexed Capaldo and the Capaldo water system is part of the Frontenac water system.

Franklin area and City of Arma, both located north of Frontenac, have a combined water supply with RWD No. 1. Due to the size of Frontenac, it is not practical for these systems to combine services or management.

Based on size, location and existing facilities, facilities that are adequate and suitable for each user, it is not technically feasible or cost effective to require full analysis of possible sharing of water supplies.

[REDACTED]

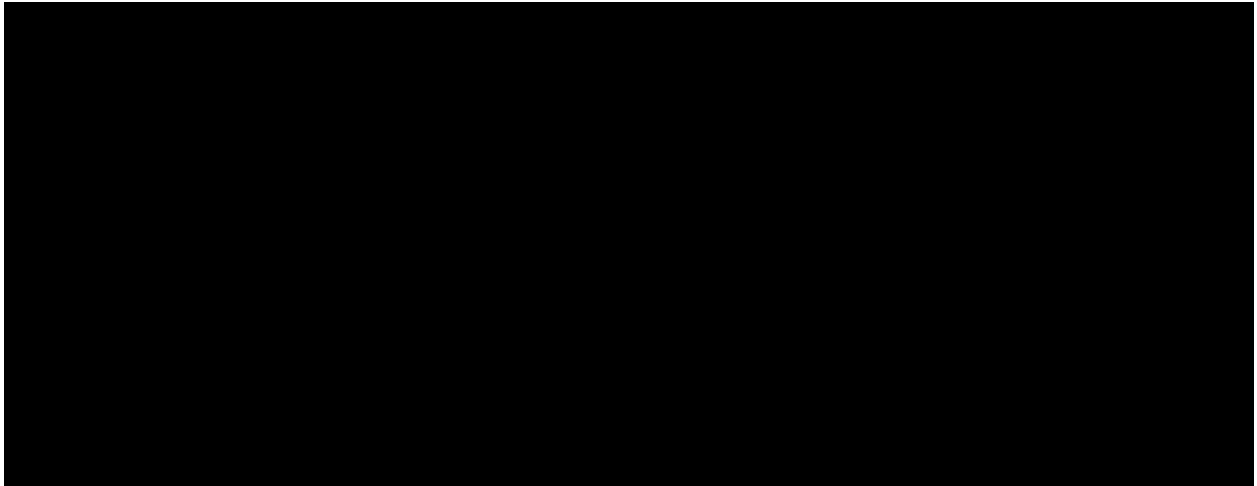
[REDACTED]

c. Water Treatment Plant

The only water treatment alternative considered feasible and cost effective is to continue to use the City's present water treatment plant with improvements recommended herein and the addition of odor control. Constructing a new plant or changing treatment process would be excessively costly and unnecessary.

Upgrading the City's existing water treatment consists of improving the existing plant by replacing worn and outdated equipment. Also, H₂S odor control is included with the plant upgrade.

The following plant improvements list shows the principal components of the plant upgrade. The schematic layout for improvements is shown on in the Exhibits section of this report.



The alternative of adding lime softening or ion exchange softening to the water treatment process was considered. However, due to the project cost for either of these softening methods and the water is only 240 mg/l of total hardness, softening is not recommended. KDHE does not recommend softening if water is less than 300 mg/l of hardness CaCO₃. Ion exchange softening would increase sodium levels in the treated water.



2. Water Distribution System Improvements

At the present time, no improvements to water distribution are needed to provide adequate water service to all water users.

3. Water Storage

Additional treated water storage is needed for maintaining adequate water service, fire protection flows and water supply during plant shut down for maintenance or caused by power outage. Alternatives for water storage are outlined below:

a. Pumped Ground Water Storage Tank

- 1) Provide 250,000 gallon in ground concrete water storage tank.
- 2) Provide high service pumps and generator for pump operation during power outages.
- 3) Piping, valves, controls and electrical.
- 4) The initial cost for the groundwater storage tank, pumps, piping, controls and structure to house pumps would be high. Also, operation and maintenance for in ground pumped storage would be higher than elevated water storage tanks, due to the cost of operation for electrical service and maintenance. Therefore, because of the cost and limited use, this alternate has been eliminated.

b. Composite and Fluted Column Elevated Water Storage Tanks

- 1) Both of these types of water storage tanks are generally used for larger volumes, 500,000 gallons or more. Therefore, no further analysis of these types of water storage tanks will be considered.

c. Pedosphere Elevated Water Storage Tank

- 1) The Pedosphere is often referred to as a single pedestal tank. Standard capacities for this type of tank range from 50,000 to 1,500,000 gallons.
- 2) Tank and pedestal are constructed of steel and tank foundation is reinforced concrete.

d. Multi-Column Elevated Water Storage Tank

- 1) The multi-column elevated water storage tank is often referred to as a legged tank. These tanks standard capacities range in size from 25,000 to 2,000,000 gallons.
- 2) Tank and supporting legs are constructed of steel and tank foundation is reinforced concrete.

* * * * *

Section 3.0

Affected Environmental Consequences

3.1 Land Use/Important Farmland/Formally Classified Lands

3.1.1 Affected Environment

All portions of the project will be located on City owned property or in existing right-of-way's. A soil map from the National Resources Conservation Service (NRCS) Web Soil Survey shows that the main composition of soils in this area are Parsons silt loam, 0 to 1 percent slopes. The Farmland Classification confirms that this area is prime farmland. The hydrologic soil group is D. The area surrounding the proposed project is urban development with a populous density, which includes several residences per acre, which makes this area classified as an existing urban development location, and is therefore not considered prime farmland.

3.1.2 Environmental Consequences

There will be no environmental resources that will be adversely impacted by the construction of the proposed improvements project.

3.1.3 Mitigation

Mitigation procedures will minimize construction traffic adjacent to the construction site, and return any soil substrate that was disturbed by the work.

3.2 Floodplains

3.2.1 Affected Environment

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) number 20037C0333E (included in Section 6), the City of Frontenac and locations to be improved upon, are not located in the flood plain or flood way.

3.2.2 Environmental Consequences

There will be no environmental resources that will be adversely impacted by the construction of the proposed improvements project.

3.2.3 Mitigation

No special mitigation procedures will be needed in accordance with floodplain management.

3.3 Wetlands

3.3.1 Affected Environment

According to the USFWS National Wetland Inventory Map for the proposed construction area, there is a 9 acre fresh water pond located approximately 750 feet to the East of the water treatment plant. Proposed improvements will not affect this pond.

3.3.2 Environmental Consequences

There are no wetlands in the area of where the proposed work is to take place. The pond that is located approximately 750 feet to the East of the water treatment plant is classified as a Palustrine, Aquatic Bed, Semi-permanently Flooded, Impounded (PABFh code).

3.3.3 Mitigation

No special mitigation procedures will be needed in accordance with wetlands management.

3.4 Historic Properties

3.4.1 Affected Environment

The US National Natural Landmarks website was utilized to determine if any historic sites exist within the boundaries of the proposed improvements, and there were none located at the time of this research. The Kansas State Historical Society has indicated with their Environmental Response that the water tower currently in use is potentially eligible for listing in the National Register of Historic Places.

3.4.2 Environmental Consequences

The EPA NEPAassist database was reviewed for relationships of environmentally regulated facilities and remediation sites. Frontenac is located in EPA Region 7. There were no issues found.

3.4.3 Mitigation

If any human remains or artifacts are discovered during project activities, the work will cease immediately, and all appropriate agencies will be contacted.

3.5 Biological Resources

3.5.1 Affected Environment

There is no affected environment due to the nature of the proposed improvements.

3.5.2 Environmental Consequences

There will be no environmental consequences due to the nature of the proposed improvements.

3.5.3 Mitigation

No special mitigation procedures will be needed in accordance with biological resources.

3.6 Water Quality Issues

3.6.1 Affected Environment

The existing water supply wells are high in hydrogen sulfide. The H₂S Air Scrubber will be used to remove the hydrogen sulfide gas odor to improve the quality of air.

3.6.2 Environmental Consequences

The H₂S Air Scrubber will help clear the air from the rotten egg like smell that is caused by hydrogen sulfide.

3.6.3 Mitigation

The City will obtain a Notice of Intent (NOI) under the Kansas Water Pollution Control general stormwater permit and National Pollutant Discharge Elimination System (NPDES) general permit. The NOI form is a request for coverage under the requirements and conditions of the Kansas “Stormwater Runoff from Construction Activities General Permit”.

3.7 Coastal Resources

3.7.1 Affected Environment

No portion of Kansas is located in a coastal zone or CBRS unit. The nearest coastline is approximately 850 miles to the South of the project location.

3.7.2 Environmental Consequences

There are no environmental consequences that apply to this environmental resource.

3.7.3 Mitigation

There are no special mitigation measures that apply to this environmental resource.

3.8 Socio-Economic/Environmental Justice Issues

3.8.1 Affected Environment

The proposed project should not have any disproportionately high and adverse human health or environmental effects to minority and low-income populations. This project will enhance the health of low-income populations by providing a safe and reliable public water supply. Also, the project will benefit all users.

3.8.2 Environmental Consequences

There are no environmental consequences that apply to this environmental resource.

3.8.3 Mitigation

There are no special mitigation measures that apply to this environmental resource.

3.9 Miscellaneous Issues

The proposed project is to ultimately improve upon the existing water treatment facility, construct a new Well No. 4 to replace inoperative Well No. 2, and replace the existing water tower with a new water tower. The major improvements outlined in Section 1.0 will drastically improve the City's water utility. With these improvements, no adverse effects on the environment, public health or safety are foreseen. By the addition of the H₂S Air Scrubber, air quality will be greatly increased, and the odor from the hydrogen sulfide will be removed.

Visually, the new water tower will be located at the City's ball diamond. This will be aesthetically pleasing in design and color, and will not hinder the overall view of the City or patrons at the ball diamond. The new Well No. 4 will not be a visual concern, as well as the water treatment plant improvements.

All improvements are considered beneficial to the water system. The construction of Well No. 4 and the new water tower, along with water treatment facility improvements, will be designed and constructed as to make the least impact on the environment and will include measures to maintain or repair existing surface features as to cause the least amount of damage as the project permits. For instance, grading and seeding will be an intricate part of the construction. Boring will be used as necessary to minimize any disturbance.

With three wells, the water supply will be capable of supplying the water treatment plants needs with only 2 wells running. This allows for recharge of the wells and maintenance if one well has to be serviced.

The upgraded water treatment plant with odor control will have the facilities and equipment to treat the Frontenac water supply up to a design rate of 1,050 gpm. With one filter out of service, the plant will still be able to treat water to meet needs of the system. There are three high service pumps and any two of the pumps are capable of meeting peak water needs.

The new elevated water storage tank will greatly improve the ability of the water utility even when wells or treatment plant are out of service. Additional water storage will cut down on the number of cycles for the well pumps and treatment plant operation. There will also be additional water available for fire protection use.

All of the proposed project improvements will greatly improve the sustainability of the water utility facilities.

All alternatives will have a minimal impact on the environment, except to improve the environment by providing better quality water and to control odors of hydrogen sulfide gas will improve air quality. Hydrogen sulfide gas removed from the well water supply at the treatment has a smell similar to rotten eggs.

The water treatment and water storage tank sites are not in a floodplain or wetland area. Plant facilities and water towers are compatible with the surrounding areas.

There are no important land resources, endangered species, historical or archaeological properties in the treatment plant or water storage tanks sites.

Waste stream flows from the water treatment plant and all waste streams from alternates considered to improve the plant will be discharged to the Frontenac wastewater system. The existing plant waste streams discharges to the wastewater systems and have not caused any waste treatment problems.

A new waste stream will be generated by the H₂S control unit and it is proposed to discharge the new waste stream to the filter backwash waste sump for disposal along with the existing process wastewater streams. The proposed method of disposal was in principle accepted by KDHE based on the agreed upon consensus outcome of the formally completed waste stream summary review and disposal method consensus process.

Included in the Exhibits Section of this report is an IPaC information for planning and conservation. According to this information, the following could be affected by activities in the location for improvements:

1) Mead's Milkweed (*Asclepias Meadii*) – Threatened

According to the U.S. Fish and Wildlife Service, Mead's milkweed is a tallgrass prairie herb which belongs to the milkweed family, known as Asclepiadaceae. Mead's milkweed is a federally threatened species. Mead's milkweed requires moderately wet (mesic) to moderately dry (dry mesic) upland tallgrass prairie or glade/barren habitat characterized by vegetation adapted for drought and fire. It persists in stable late-successional prairie.

2) Gray Bat (*Myotis grisescens*) – Endangered

According to the U.S. Fish and Wildlife Service, Gray bats are an endangered species and are in danger of becoming extinct. Gray bats live in caves year-round. They hibernate in deep, vertical caves, and in the summer, they roost in caves which are scattered along rivers. These caves are in limestone karst areas of the southeastern U.S. They do not use houses or barns.

3) Northern Long-eared Bat (*Myotis septentrionalis*) – Threatened

According to the U.S. Fish and Wildlife Service, the northern long-eared bat is one of the species of bats most impacted by the disease white-nose syndrome. Due to the spread of the disease and decline of this species, it is listed as threatened.

4) 29 Different Migratory Birds

The migratory bird species listed in the IPaC are birds of conservation concern. The IPaC mentions that it is important to try and avoid and minimize impacts to all birds, and special attention should be made to avoid and minimize impacts to birds of priority concern.

The improvements for this proposed project do not take place in special habitats for any of the above listed species. Impact to the environment will be minimal with the proposed improvements to take place.

* * * * *

Rev. March 1, 2017

Affected Environmental
Consequences

Section 4.0

Summary of Mitigation

4.1 Proposed Mitigation Measures

- A. The City will obtain a Notice of Intent (NOI) under the Kansas Water Pollution Control general stormwater permit and National Pollutant Discharge Elimination System (NPDES) general permit. The NOI form is a request for coverage under the requirements and conditions of the Kansas “Stormwater Runoff from Construction Activities General Permit”.
- B. Seeding the disturbed areas of construction is included as a part of the proposed project. Vegetation will be consistent with the type of vegetation that has been disturbed during construction, such as native warm-season grasses, forbs and trees.
- C. Plans and Specifications will be submitted to KDHE for approval of the proposed project.
- D. If any discoveries are made that reflect evidence of human remains, ceremonial or cultural objects, or other historical items are discovered, construction will be halted, with appropriate agencies and tribes contacted immediately.
- E. Prior to project commencing, a Change in Point of Diversion under existing water rights will be filed with KDA Division of Water Resources for the new well.

* * * * *

<i>Rev. March 1, 2017</i>

Section 5.0

Correspondence and Coordination

5.1 General Correspondence

A formal Waste Stream Summary Review and Disposal Method Process has been successfully completed. The following is the consensus of the summary review by KDHE:

“An accepted consensus outcome pertaining to the environmentally responsible disposal of this project’s waste streams has been reached.

Disposing of the H₂S scrubber blow down by way of the City’s sanitary sewer collection/treatment system has in concept been found to be acceptable. The scrubber blow down will be combined with the existing process wastewater at the existing filter backwash water process wastewater sump.

The City of Frontenac will be installing a hydrogen sulfide (H₂S) air/liquid scrubber at its water treatment plant to treat air from their water treatment plant’s raw water aerator which removes H₂S from the City’s groundwater source waters. The scrubber will chemically capture the H₂S in the aerator outlet air stream in the liquid phase before the air is then released back into the atmosphere sans the H₂S. The new treatment system will be targeting a long-standing odor problem in the community.

The City’s water treatment plant has both process and domestic wastewater streams and they are separately discharged to the City’s sanitary sewer system. A new process wastewater stream will be generated by the new H₂S scrubber unit. The scrubber blowdown will be combined with the existing general process wastewater stream and also sent to the City’s sanitary sewer collection/treatment system. The City’s waste stabilization ponds are located west of the City at McKay Street and South 210th Street. The stabilization pond system discharge flows to the Neosho River by way of Cow Creek under an existing NPDES permit. The additional volume and character of the new waste stream is within the hydraulic and treatment capacity of the City’s sanitary sewer collection and treatment system.

Please note that any changes in the project, e.g., treatment, waste streams, storage, distribution and pumping, siting/land acquisition, for example, will necessitate revisiting the formal waste stream summary review and disposal method consensus process with a submittal revised accordingly.

Please be sure to incorporate the waste stream handling method reviewed in this process in all project related documents from here forward.

While it is recognized that the City’s sanitary sewer treatment system is permitted to discharge under a current NPDES permit, the permit will be subject to review and revision should the additional wastewater load to the facility become problematic for the City. Should that be the case, the formal submission of a revised NPDES wastewater permit application for review would be required. Additionally, the submission of an anti-degradation study for review may also be

required prior to the issuance of a revised National Pollutant Discharge Elimination System (NPDES) Permit by KDHE.

Lastly, we respectfully clarify that this correspondence does not in any manner convey immediate KDHE approval to initiate disposal of waste generated by this project. It is strongly recommended that all permits relevant to this project be properly secured prior to letting bids for construction or actually starting construction, but without exception before initiating the disposal of any waste generated by this project. The responsibility for securing all relevant permits rests solely with the public water supply system and their consultant.”

5.2 Agencies Notified

U.S. Department of the Interior Fish & Wildlife	Rec. 12-29-2016
Army Corps. of Engineers	Rec. 2-10-2017
State Conservationist with form AD-1006	No Response
Kansas Department of Wildlife and Parks	Rec. 1-20-2017
Kansas Water Office	No Response
Kansas State Historical Society	Rec. 1-4-2017
Kansas Biological Survey	Rec. 1-7-2017
KDA, Division of Water Resources	Rec. 1-11-2017
State Conservation Commission	No Response
Kansas Corporation Commission	Rec. 1-3-2017
Kansas Geological Survey	Rec. 1-7-2017
Kansas Department of Health and Environment	Rec. 1-19-2017
Osage Nation	Rec. 1-25-2017
Cheyenne and Arapaho Tribes	Rec. 1-14-2017
Seneca-Cayuga Nation	No Response
United Keetoowah Band of Cherokee Indians in Oklahoma	No Response
Wichita, Keechi, Waco and Tawakonie Tribes	No Response

Correspondence from Agencies Listed Above Start on the Following Page:

INTERGOVERNMENTAL REVIEW TRANSMITTAL FORM

Comments By: USFWS Transmittal Date: December 20, 2016

Project Title: Water Supply, Storage and Treatment Improvements, City of Frontenac,
Crawford County, Kansas

Contact Person: Josh B. Kramer

Return To: KRAMER CONSULTING, LLC
4336 SE 37th Street
Topeka, Kansas 66605

This form provides notification and the opportunity for your agency to review and comment on the proposed project as required by Executed Order 12372. Please complete Parts I and II as appropriate. Your response by **January 31, 2017** will be appreciated.

PART I - AGENCY REVIEW COMMENTS: Date 12-28-2016

☒ No Concerns/No Comment

Signed 

For: Jason Luginbill
Field Office Supervisor
U.S. Fish and Wildlife Service
Kansas Ecological Services

PART II - RECOMMENDED ACTION COMMENTS:

- ☐ Clearance of the project should be granted.
- ☐ Clearance of the project should not be granted.
- ☐ Clearance of the project should be delayed until the issues or questions have been clarified.
- ☐ Clearance of the project should not be delayed, but the Applicant should (in final design and/or permit application) address and clarify the questions or concerns indicated above.
- ☐ Request the opportunity to review final application prior to submission to the federal funding agency.
- ☐ Request the State Process Recommendation in concurrence with above comments.

Reviewer's Name: Gibran Sulaiman

Date: 12.28.2016



Josh Kramer <josh@kramerllc.net>

USACE Project Review: City of Frontenac Water Supply Improvements (NWK-2016-01953)

1 message

Bartels, Brian C CIV USARMY CENWK (US) <Brian.C.Bartels@usace.army.mil>
To: "josh@kramerllc.net" <josh@kramerllc.net>

Thu, Feb 2, 2017 at 10:13 AM

Mr. Kramer:

Just to reiterate our phone conversation, because the proposed work to upgrade the City of Frontenac's water supply, storage, and treatment facilities will occur within uplands, permit verification from the Corps of Engineers is not required. Thus, a letter stating such is forthcoming. Let me know if you have any questions.

Brian Bartels
Regulatory Specialist
U.S. Army Corps of Engineers
Kansas State Regulatory Office
2710 NE Shady Creek Access Road
El Dorado, KS 67042
[316-322-8247](tel:316-322-8247) (main office)

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): February 8, 2017

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Kansas City District, NWK-2016-01953

C. PROJECT LOCATION AND BACKGROUND INFORMATION:

State: **Kansas** County/parish/borough: **Crawford** City: **Frontenac**

Center coordinates of site (lat/long in degree decimal format): [REDACTED]

Universal Transverse Mercator: **NA**

Name of nearest waterbody: **Unnamed tributary to East Cow Creek**

Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: **Neosho River**

Name of watershed or Hydrologic Unit Code (HUC): **11070207**

☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.

☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc...) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☒ Office (Desk) Determination. Date: **February 02, 2017**

☐ Field Determination. Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "navigable waters of the U.S." within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [Required]

☐ Waters subject to the ebb and flow of the tide.

☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.
Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are no** "waters of the U.S." within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [Required]

1. Waters of the U.S.

a. Indicate presence of waters of U.S. in review area (check all that apply):¹

- ☐ TNWs, including territorial seas
- ☐ Wetlands adjacent to TNWs
- ☐ Relatively permanent waters² (RPWs) that flow directly or indirectly into TNWs
- ☐ Non-RPWs that flow directly or indirectly into TNWs
- ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
- ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
- ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
- ☐ Impoundments of jurisdictional waters
- ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

b. Identify (estimate) size of waters of the U.S. in the review area:

Non-wetland waters: linear feet: width (ft) and/or acres.

Wetlands: acres.

c. Limits (boundaries) of jurisdiction based on: **Not Applicable.**

Elevation of established OHWM (if known): .

2. Non-regulated waters/wetlands (check if applicable):³

☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional.
Explain: .

¹ Boxes checked below shall be supported by completing the appropriate sections in Section III below.

² For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).

³ Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW

Identify TNW: .

Summarize rationale supporting determination: .

2. Wetland adjacent to TNW

Summarize rationale supporting conclusion that wetland is “adjacent”: .

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are “relatively permanent waters” (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody⁴ is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:

Watershed size: acres

Drainage area: acres

Average annual rainfall: inches

Average annual snowfall: inches

(ii) Physical Characteristics:

(a) Relationship with TNW:

☐ Tributary flows directly into TNW.

☐ Tributary flows through **Pick List** tributaries before entering TNW.

Project waters are **Pick List** river miles from TNW.

Project waters are **Pick List** river miles from RPW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Project waters are **Pick List** aerial (straight) miles from RPW.

Project waters cross or serve as state boundaries. Explain: .

Identify flow route to TNW⁵: .

Tributary stream order, if known: .

⁴ Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

⁵ Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

Tributary is: ☐ Natural
☐ Artificial (man-made). Explain: .
☐ Manipulated (man-altered). Explain: .

Tributary properties with respect to top of bank (estimate):

Average width: feet
Average depth: feet
Average side slopes: **Pick List**.

Primary tributary substrate composition (check all that apply):

☐ Silts ☐ Sands ☐ Concrete
☐ Cobbles ☐ Gravel ☐ Muck
☐ Bedrock ☐ Vegetation. Type/% cover:
☐ Other. Explain: .

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: .

Presence of run/riffle/pool complexes. Explain: .

Tributary geometry: **Pick List**

Tributary gradient (approximate average slope): %

(c) Flow:

Tributary provides for: **Pick List**

Estimate average number of flow events in review area/year: **Pick List**

Describe flow regime: .

Other information on duration and volume: .

Surface flow is: **Pick List**. Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .

☐ Dye (or other) test performed: .

Tributary has (check all that apply):

☐ Bed and banks
☐ OHWM⁶ (check all indicators that apply):
☐ clear, natural line impressed on the bank ☐ the presence of litter and debris
☐ changes in the character of soil ☐ destruction of terrestrial vegetation
☐ shelving ☐ the presence of wrack line
☐ vegetation matted down, bent, or absent ☐ sediment sorting
☐ leaf litter disturbed or washed away ☐ scour
☐ sediment deposition ☐ multiple observed or predicted flow events
☐ water staining ☐ abrupt change in plant community
☐ other (list):
☐ Discontinuous OHWM.⁷ Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

☐ High Tide Line indicated by: ☐ Mean High Water Mark indicated by:
☐ oil or scum line along shore objects ☐ survey to available datum;
☐ fine shell or debris deposits (foreshore) ☐ physical markings;
☐ physical markings/characteristics ☐ vegetation lines/changes in vegetation types.
☐ tidal gauges
☐ other (list):

(iii) **Chemical Characteristics:**

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).

Explain: .

Identify specific pollutants, if known: .

⁶A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.

⁷Ibid.

(iv) **Biological Characteristics. Channel supports (check all that apply):**

- ☐ Riparian corridor. Characteristics (type, average width): .
- ☐ Wetland fringe. Characteristics: .
- ☐ Habitat for:
 - ☐ Federally Listed species. Explain findings: .
 - ☐ Fish/spawn areas. Explain findings: .
 - ☐ Other environmentally-sensitive species. Explain findings: .
 - ☐ Aquatic/wildlife diversity. Explain findings: .

2. **Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW**

(i) **Physical Characteristics:**

(a) General Wetland Characteristics:

Properties:

Wetland size: . acres

Wetland type. Explain: .

Wetland quality. Explain: .

Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List**. Explain: .

Surface flow is: **Pick List**

Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .

☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

☐ Directly abutting

☐ Not directly abutting

☐ Discrete wetland hydrologic connection. Explain: .

☐ Ecological connection. Explain: .

☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List**.

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) **Chemical Characteristics:**

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: .

Identify specific pollutants, if known: .

(iii) **Biological Characteristics. Wetland supports (check all that apply):**

- ☐ Riparian buffer. Characteristics (type, average width): .
- ☐ Vegetation type/percent cover. Explain: .
- ☐ Habitat for:
 - ☐ Federally Listed species. Explain findings: .
 - ☐ Fish/spawn areas. Explain findings: .
 - ☐ Other environmentally-sensitive species. Explain findings: .
 - ☐ Aquatic/wildlife diversity. Explain findings: .

3. **Characteristics of all wetlands adjacent to the tributary (if any)**

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately () acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)

Size (in acres)

Directly abuts? (Y/N)

Size (in acres)

Summarize overall biological, chemical and physical functions being performed: .

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .
2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .
3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:

- ☐ TNWs: linear feet width (ft), Or, acres.
- ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**

- ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
- ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

Provide estimates for jurisdictional waters in the review area (check all that apply):

- ☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

3. Non-RPWs⁸ that flow directly or indirectly into TNWs.

- ☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):

- ☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

4. Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.

- ☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .
☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.

- ☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.

- ☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. Impoundments of jurisdictional waters.⁹

As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.

- ☐ Demonstrate that impoundment was created from "waters of the U.S.," or
☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):¹⁰

- ☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain: .
☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

⁸See Footnote # 3.

⁹To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.

¹⁰ Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA Memorandum Regarding CWA Act Jurisdiction Following Rapanos.

Provide estimates for jurisdictional waters in the review area (check all that apply):

- ☐ Tributary waters: linear feet width (ft).
- ☐ Other non-wetland waters: acres.
Identify type(s) of waters: .
- ☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):

- ☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
- ☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
 - ☐ Prior to the Jan 2001 Supreme Court decision in "SWANCC," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
- ☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: .
- ☒ Other: (explain, if not covered above): **Project areas within upland; discharge of dredged/fill within WOUS will not occur.**

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):

- ☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource: .
- ☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):

- ☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource: .
- ☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):

- ☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: **Kramer Consulting, Josh Kramer.**
- ☐ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
 - ☐ Office concurs with data sheets/delineation report.
 - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps: .
- ☐ Corps navigable waters' study: .
- ☐ U.S. Geological Survey Hydrologic Atlas: .
 - ☐ USGS NHD data.
 - ☐ USGS 8 and 12 digit HUC maps.
- ☒ U.S. Geological Survey map(s). Cite scale & quad name: **Pittsburg, 1:24,000.**
- ☐ USDA Natural Resources Conservation Service Soil Survey. Citation: .
- ☒ National wetlands inventory map(s). Cite name: **USFWS Wetland Data.**
- ☐ State/Local wetland inventory map(s): .
- ☐ FEMA/FIRM maps: .
- ☐ 100-year Floodplain Elevation is: (National Geodetic Vertical Datum of 1929)
- ☒ Photographs: ☒ Aerial (Name & Date): **Google Earth, 11/14/2016.**
or ☐ Other (Name & Date): Photos provided by applicant agent.
- ☐ Previous determination(s). File no. and date of response letter: .
- ☐ Applicable/supporting case law: .
- ☐ Applicable/supporting scientific literature: .
- ☐ Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD: .

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: City of Frontenac		File Number: NWK-2016-01953	Date: 10 Feb. 2017
Attached is:			See Section below
	A. INITIAL PROFFERED PERMIT (Standard Permit or Letter of Permission)	A	
	B. PROFFERED PERMIT (Standard Permit or Letter of Permission)	B	
	C. PERMIT DENIAL	C	
X	D. APPROVED JURISDICTIONAL DETERMINATION	D	
	E. PRELIMINARY JURISDICTIONAL DETERMINATION	E	

SECTION I - The following identifies your rights and options regarding a modification, reconsideration, or administrative appeal of the above decision. Additional information may be found at <http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/appeals.aspx> or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or request modification of the permit.

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the District Engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **REQUEST MODIFICATION:** If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the District Engineer. Your objections must be received by the District Engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the District Engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the District Engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit.

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the District Engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **APPEAL:** If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the Division Engineer (address on page 2). This form must be received by the Division Engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the Division Engineer (address on page 2). This form must be received by the Division Engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept the approved JD, appeal the approved JD, or submit new information and request reconsideration of the approved JD.

- **ACCEPT:** You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- **APPEAL:** If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the Division Engineer (address on page 2). This form must be received by the Division Engineer within 60 days of the date of this notice.
- **RECONSIDERATION BASED ON NEW INFORMATION:** You may submit new information to the District Engineer for reconsideration of an approved JD. You must submit the information within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II –Fill out this section and return this form to the appropriate office only if submitting a request for modification or reconsideration to the District Engineer, or if submitting a request for Administrative Appeal to the Division Engineer. All such submittals must be made within 60 days of the date of this notice.

Submit the following requests to the District Engineer

- A. Modification of an INITIAL PROFFERED PERMIT (Item A).
- D. Reconsideration of an APPROVED JURISDICTIONAL DETERMINATION based on NEW INFORMATION (Item D RECONSIDERATION).

Submit the following requests to the Division Engineer

- B. Administrative Appeal of a PROFFERED PERMIT (Item B).
- C. Administrative Appeal of a PERMIT DENIAL (Item C).
- D. Administrative Appeal of an APPROVED JURISDICTIONAL DETERMINATION (Item D APPEAL) (for reasons other than reconsideration of an approved JD based on new information).

(Note: Preliminary Jurisdictional Determinations (Item E) are not appealable. If you have concerns regarding a preliminary Jurisdictional Determination, you can request an approved Jurisdictional Determination).

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

SUBMITTAL OF NEW OR ADDITIONAL INFORMATION: The District Engineer may accept and consider new information if you request a modification to an initial proffered permit (Part A), or a reconsideration of an approved JD (Part D). An administrative appeal to the Division Engineer is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the administrative record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:

DISTRICT ENGINEER

Attn: Mark D. Frazier

Chief, Regulatory Branch

U.S. Army Engineer District, Kansas City

601 Federal Building, Room 402

Kansas City, MO 64106-2824

Telephone: 816-389-3990

(Use this address for submittals to the District Engineer)

If you wish to submit an appeal or have questions regarding the appeal process you may contact:

DIVISION ENGINEER

ATTN: Melinda M. Witgenstein

Regulatory Appeals Review Officer

U.S. Army Corps of Engineers

P.O. Box 2870

Portland, OR 97208-2870

Telephone: 503-808-3888

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

Signature of appellant or agent.

Date:

Telephone number:



DEPARTMENT OF THE ARMY
KANSAS CITY DISTRICT, CORPS OF ENGINEERS
KANSAS STATE REGULATORY OFFICE
2710 NE SHADY CREEK ACCESS ROAD
EL DORADO, KANSAS 67042

February 10, 2017

Kansas State Regulatory Office
(NWK-2016-01953)
(Crawford County, KS NPR)

Josh Kramer
Kramer Consulting, LLC
4336 Southeast 37th Street
Topeka, Kansas 66605

Dear Mr. Kramer:

RE: City of Frontenac—improvements to water supply, storage, and treatment

This letter pertains to an application you submitted on behalf of the City of Frontenac for comments regarding improvements to water supply, storage, and treatment improvements. It was received on December 22, 2016. The area reviewed is within Section 04, Township 30 South, Range 25 East, Crawford County, Kansas (N 37.457591°, W 94.680911°).

This letter contains an approved jurisdictional determination for the proposed project. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 C.F.R. Part 331. Enclosed you will find a Notification of Administrative Appeal Options and Process and Request for Appeal (NAO-RFA) form. If you request to appeal this determination you must submit a completed NAO-RFA form to the Northwestern Division Office at the following address:

Division Engineer
ATTN: Melinda M. Witgenstein
Regulatory Appeals Review Officer
U.S. Army Corps of Engineers
P.O. Box 2870
Portland, OR 97208-2870
Telephone: 503-808-3888

In order for an NAO-RFA to be accepted by the Corps, the Corps must determine that it is completed, that it meets the criteria for appeal under 33 C.F.R. Part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAO-RFA. Should you decide to submit an NAO-RFA form, it must be received at the above address by **April 11, 2017**. It is not necessary to submit an NAO-RFA form to the Division Office if you do not object to the determination in this letter.

In the event that you disagree with an approved jurisdictional determination and you have **new information** not considered in the original determination, you may request reconsideration of that determination by the Corps District prior to initiating an appeal. To request this reconsideration based upon new information, you must submit the completed NAO-RFA form and the new information to the District Office so that it is received within 60 days of the date of the NAO-RFA. Send approved jurisdictional determination reconsideration requests to:

District Commander
ATTN: Mark D. Frazier
Chief, Regulatory Branch
U.S. Army Engineer District, Kansas City
601 East 12th Street, Suite 402
Kansas City, MO 64106-2824
Voice: 816-389-3990 – FAX: 816-389-2032

The Corps of Engineers has jurisdiction over all waters of the United States (WOUS). Discharges of dredged or fill material in WOUS, including wetlands, require prior authorization from the Corps under Section 404 of the Clean Water Act (33 USC 1344). The implementing regulation for this Act is found at 33 CFR 320-332,

<http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/FederalRegulation.aspx>.

We have reviewed the information furnished and have determined that the proposed activity is within upland and will not involve the discharge of dredged or fill material within WOUS. Therefore, Department of the Army permit authorization is not required. However, other Federal, state and/or local permits might be required and you should verify this yourself.

We are interested in your thoughts and opinions concerning your experience with the Kansas City District, Corps of Engineers Regulatory Program. Please feel free to complete our Customer Service Survey form on our website at: http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey. You also may call and request a paper copy of the survey which you may complete and return to us by mail or fax.

Brian Bartels, Regulatory Project Manager, reviewed the information furnished and made this determination. If you have any questions concerning this matter, please contact Brian at (816) 389-3745 or email brian.c.bartels@usace.army.mil. Please reference Permit **NWK-2016-01953** in comments and/or inquiries relating to this project.

Enclosures

Copies Furnished (electronically w/o enclosures):

Environmental Protection Agency—Watershed Planning and Implementation Branch
U.S. Fish and Wildlife Service, Manhattan, Kansas
Kansas Department of Wildlife, Parks, and Tourism
Kansas Department of Health and Environment
Kansas Department of Agriculture—Division of Water Resources

INTERGOVERNMENTAL REVIEW TRANSMITTAL FORM

Comments By: _____ Transmittal Date: December 20, 2016

Project Title: Water Supply, Storage and Treatment Improvements, City of Frontenac,
Crawford County, Kansas

Contact Person: Josh B. Kramer

Return To: KRAMER CONSULTING, LLC
4336 SE 37th Street
Topeka, Kansas 66605

This form provides notification and the opportunity for your agency to review and comment on the proposed project as required by Executed Order 12372. Please complete Parts I and II as appropriate. Your response by **January 31, 2017** will be appreciated.

PART I - AGENCY REVIEW COMMENTS:

PART II - RECOMMENDED ACTION COMMENTS:

- ___ Clearance of the project should be granted.
 - ___ Clearance of the project should not be granted.
 - ___ Clearance of the project should be delayed until the issues or questions have been clarified.
 - ___ Clearance of the project should not be delayed, but the Applicant should (in final design and/or permit application) address and clarify the questions or concerns indicated above.
 - ___ Request the opportunity to review final application prior to submission to the federal funding agency.
 - ___ Request the State Process Recommendation in concurrence with above comments.
-

Reviewer's Name: _____

Date: _____



Josh Kramer <josh@kramerllc.net>

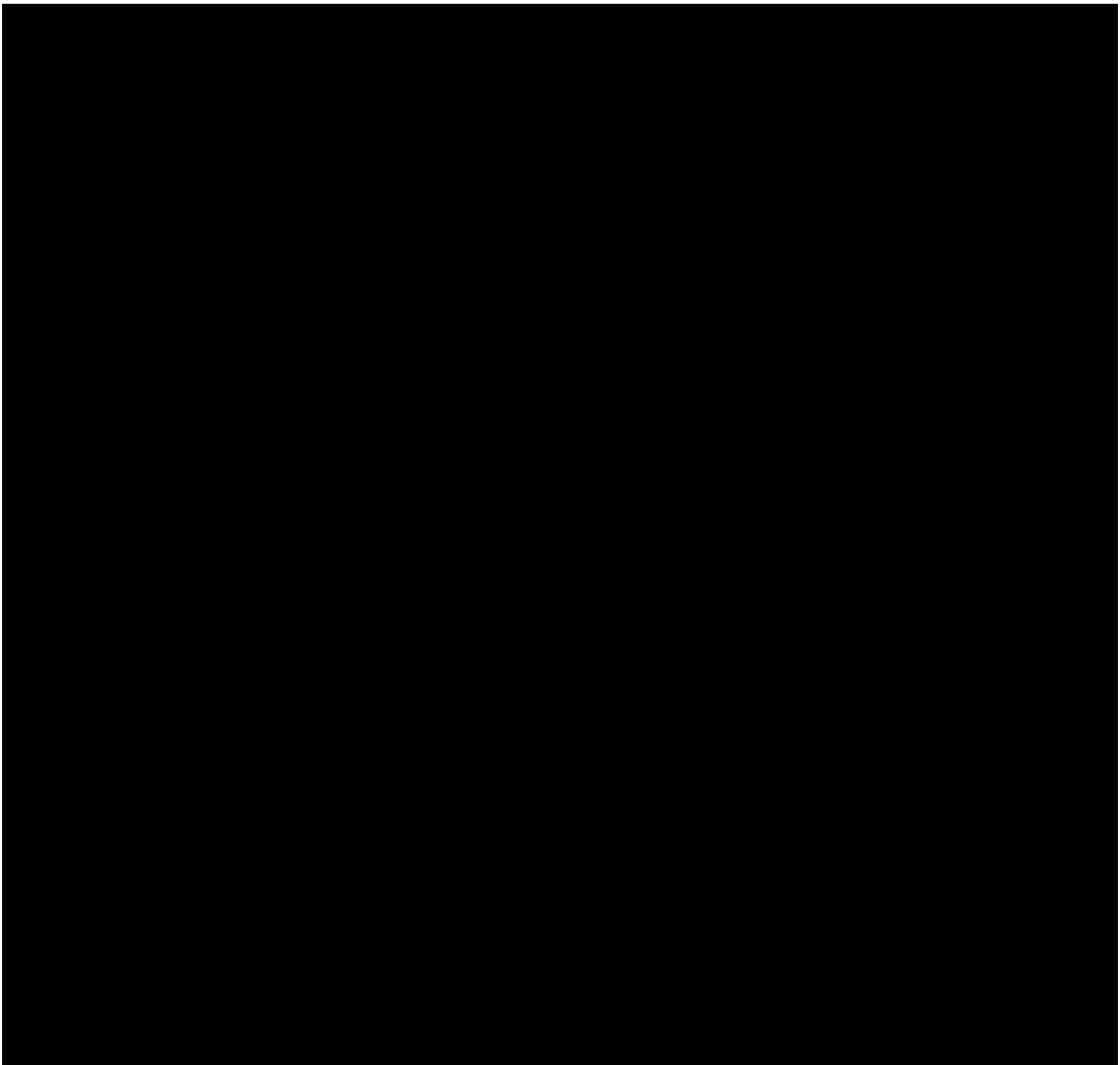
**KDWPT Review - Frontenac Water Supply Improvements (Crawford County) -
KDWPT Track #201050859-2**

2 messages

Eddy, Zac [KDWPT] <Zac.Eddy@ks.gov>
To: "josh@kramerllc.net" <josh@kramerllc.net>

Fri, Jan 20, 2017 at 4:14 PM

Dear Mr Kramer,



Since the Department's recreational land obligations and the State's species listings periodically change, if construction has not started within one year of this date, or if design changes are made in the project plans, the project sponsor must contact this office to verify continued applicability of this assessment report. For our purposes, we consider construction started when advertisements for bids are distributed.

Please consider this email our official review for this project. Thank you for the opportunity to provide these comments and recommendations. Please let me know if you have any questions or concerns about the preceding information.

Please direct all review materials electronically to kdwpt.ess@ks.gov to streamline the review process for all parties.

Thank you.



--

Please note my new email address.

Zac Eddy

Terrestrial Ecologist

Kansas Dept. of Wildlife, Parks, & Tourism

Ecological Services Section

512 SE 25th Ave.

Pratt, KS 67124

[\(620\)672-0788](tel:(620)672-0788) [office]

[\(620\)388-0043](tel:(620)388-0043) [mobile]

zac.eddy@ks.gov

"A thing is right when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise." - Aldo Leopold, A Sand County Almanac



6425 SW 6th Avenue
Topeka KS 66615

phone: 785-272-8681
fax: 785-272-8682
cultural_resources@kshs.org

Sam Brownback, Governor
Jennie Chinn, Executive Director

KSR&C # 17-01-006
January 4, 2017

Josh Kramer
Kramer Consulting, LLC
Via Email

Re: Water System Improvements, City of Frontenac – Crawford County

We have reviewed the materials received December 22, 2016 regarding the above-referenced project in accordance with 36 CFR Part 800. In reviews of this nature, the SHPO determines whether a federally funded, licensed, or permitted project will adversely affect properties that are listed or determined eligible for listing in the National Register of Historic Places. The SHPO has determined that the existing Frontenac Water Tower [REDACTED] potentially eligible for listing in the National Register of Historic Places. The proposed scope of work does not include demolition of the tower, and will not adversely affect any properties listed or determined eligible for listing in the National Register. As far as this office is concerned the project may proceed.

Thank you for giving us the opportunity to comment on this proposal. Please refer to the Kansas State Review & Compliance number (KSR&C#) listed above on any future correspondence. Please submit any comments or questions regarding this review to Lauren Jones at 785-272-8681, ext. 225 or ljones@kshs.org.

Sincerely,

Jennie Chinn
State Historic Preservation Officer

Patrick Zollner
Director, Cultural Resources Division
Deputy State Historic Preservation Officer

INTERGOVERNMENTAL REVIEW TRANSMITTAL FORM

Comments By: Kansas Biological Survey Transmittal Date: December 20, 2016

Project Title: Water Supply, Storage and Treatment Improvements, City of Frontenac,
Crawford County, Kansas

Contact Person: Josh B. Kramer

Return To: KRAMER CONSULTING, LLC
4336 SE 37th Street
Topeka, Kansas 66605

This form provides notification and the opportunity for your agency to review and comment on the proposed project as required by Executed Order 12372. Please complete Parts I and II as appropriate. Your response by **January 31, 2017** will be appreciated.

PART I - AGENCY REVIEW COMMENTS:

No objections or concerns.

PART II - RECOMMENDED ACTION COMMENTS:

- ☒ Clearance of the project should be granted.
- ☐ Clearance of the project should not be granted.
- ☐ Clearance of the project should be delayed until the issues or questions have been clarified.
- ☐ Clearance of the project should not be delayed, but the Applicant should (in final design and/or permit application) address and clarify the questions or concerns indicated above.
- ☐ Request the opportunity to review final application prior to submission to the federal funding agency.
- ☐ Request the State Process Recommendation in concurrence with above comments.

Reviewer's Name: Paul M. Liechti

Date: 1/5/2017

1320 Research Park Drive
Manhattan, Kansas 66502
(785) 564-6700



900 SW Jackson, Room 456
Topeka, Kansas 66612
(785) 296-3556

Jackie McClaskey, Secretary

Governor Sam Brownback

JOSH KRAMER
KRAMER CONSULTING LLC
4336 SE 37TH ST
TOPEKA KS 66605
Email: Josh@KramerLLC.net

January 11, 2017

RE: City of Frontenac Water Improvement Project

Dear Mr. Kramer:

This correspondence will acknowledge receipt of your environmental review request for the city of Frontenac's water system improvement project. This request was received in our office on December 22, 2016.

The Division of Conservation has no objection to this project. The Water Structures Program of the Division of Water Resources has no objection to this project.

After review of the documentation submitted, the KDA Division of Water Resources Water Appropriations unit has determined that a Change Application will need to be filed to allow for the change in point of diversion from the current Well #2 to the proposed Well #4. The project cannot proceed prior to the change approval. Please contact Caleb Fabrycky at that Parsons Satellite Office (620) 421-2697 or the Topeka Field Office at (785) 296-5733 to discuss this change and begin the change application process.

Thank you for the opportunity to review this project.

Please note for future inquiries, in an attempt to streamline the environmental review process, there will be one joint response from the Kansas Department of Agriculture Division of Water Resources and Division of Conservation. Only one request for review to our agency will be necessary.

Sincerely,

Laura L Moody
Data Management/Environmental Reviews
Kansas Department of Agriculture Division of Water Resources
(785) 564-6674
laura.moody@ks.gov
<http://agriculture.ks.gov/dwr>

INTERGOVERNMENTAL REVIEW TRANSMITTAL FORM

Comments By: Laura Moody Transmittal Date: December 20, 2016
Kansas Dept of Ag Division of
Water Resources

Project Title: Water Supply, Storage and Treatment Improvements, City of Frontenac,
Crawford County, Kansas

Contact Person: Josh B. Kramer

Return To: KRAMER CONSULTING, LLC
4336 SE 37th Street
Topeka, Kansas 66605

This form provides notification and the opportunity for your agency to review and comment on the proposed project as required by Executed Order 12372. Please complete Parts I and II as appropriate. Your response by **January 31, 2017** will be appreciated.

PART I - AGENCY REVIEW COMMENTS:

The project will require a change in point of diversion which must be approved by the Division of Water Resources prior to proceeding. Please see accompanying letter.

WATER RESOURCES
RECEIVED

DEC 22 2016

KS DEPT OF AGRICULTURE

PART II - RECOMMENDED ACTION COMMENTS:

- ☐ Clearance of the project should be granted.
- ☐ Clearance of the project should not be granted.
- ☒ Clearance of the project should be delayed until the issues or questions have been clarified.
- ☐ Clearance of the project should not be delayed, but the Applicant should (in final design and/or permit application) address and clarify the questions or concerns indicated above.
- ☐ Request the opportunity to review final application prior to submission to the federal funding agency.
- ☐ Request the State Process Recommendation in concurrence with above comments.

Reviewer's Name: Laura A Moody Date: 1/11/2017



Josh Kramer <josh@kramerllc.net>

Environmental Assessment Request - City of Frontenac

2 messages

Jonelle Rains <j.rains@kcc.ks.gov>

Tue, Jan 3, 2017 at 10:07 AM

To: "Josh@KramerLLC.net" <Josh@kramerllc.net>

Re: Environmental Assessment**City of Frontenac – Water Supply and Treatment Improvements****Sections 4 and 9 of 30S-25E****Crawford County, Kansas**

Dear Mr. Kramer:

A review of Conservation Division files failed to indicate any drilling activity within the acreage described above. However, wells or surface ponds may exist or have existed within the acreage described above which we do not have any record of. Should any oil field related problems or wells be located during construction, please call Steve Korf, District Supervisor, at (620) 432-2300.

If you have any questions or concerns, please call me at (316) 337-6226.

Jonelle Rains*Supervisor*

Environmental Protection and Remediation

Kansas Corporation Commission

266 N Main, Ste 220 | Wichita, KS | 67202-1513

December 30, 2016



Cc: Dan Suchy, Kansas Geological Survey

A Research and Service Division of the University of Kansas

1930 Constant Avenue | Lawrence, KS 66047-3724 | (785) 864-3965 | Fax 785-864-5317 | www.kgs.ku.edu

INTERGOVERNMENTAL REVIEW TRANSMITTAL FORM

Comments By: Kansas Geological Survey Transmittal Date: December 20, 2016

Project Title: Water Supply, Storage and Treatment Improvements, City of Frontenac,
Crawford County, Kansas

Contact Person: Josh B. Kramer

Return To: KRAMER CONSULTING, LLC
4336 SE 37th Street
Topeka, Kansas 66605

This form provides notification and the opportunity for your agency to review and comment on the proposed project as required by Executed Order 12372. Please complete Parts I and II as appropriate. Your response by **January 31, 2017** will be appreciated.

PART I - AGENCY REVIEW COMMENTS:

(See attached letter).

PART II - RECOMMENDED ACTION COMMENTS:

- ☒ Clearance of the project should be granted.
- ☐ Clearance of the project should not be granted.
- ☐ Clearance of the project should be delayed until the issues or questions have been clarified.
- ☐ Clearance of the project should not be delayed, but the Applicant should (in final design and/or permit application) address and clarify the questions or concerns indicated above.
- ☐ Request the opportunity to review final application prior to submission to the federal funding agency.
- ☐ Request the State Process Recommendation in concurrence with above comments.

Reviewer's Name: Gaisheng Liu

Date: 01/03/2017

Division Environment
1000 SW Jackson, Ste 400
Topeka, KS 66610



Phone: 785.296.1535
Fax: 785.296.8464
jmittell@kdheks.gov
www.kdheks.gov

Susan Mosier, MD, Secretary

Department of Health & Environment

Sam Brownback, Governor

Comments by: KDHE

Transmittal Date: January 17, 2017

This form provides notification and the opportunity for your agency to review and comments on this proposed project as required by Executive Order 12372. Review Agency, please complete Parts II and III as appropriate and return to the contact person listed below. Your prompt response will be appreciated.

Return To: Josh Kramer, E.I.T.
Kramer Consulting, LLC
4336 SE 37th Street
Topeka, KS 66605

PART I

REVIEW AGENCIES/COMMISSION

☐ Aging
☐ Agriculture
☐ Biological Survey
☐ Conservation Commission
☐ Corporation Commission

☐ Education
☐ Geological Survey, KS
☒ Health & Environment
☐ Historical Society
☐ Social & Rehabilitation

☐ State Forester
☐ Transportation
☐ Water Office, KS
☐ Wildlife & Parks
☐ Commerce

PART II

AGENCY REVIEW COMMENTS

COMMENTS: (Attach additional sheet if necessary) Re: Water Supply, Storage and Treatment Improvements, City of Frontenac, KS

Please see the enclosed comments submitted by Kevin Moon, Gary Richards and Maggie Weiser Bureau of Environmental Remediation. Cathy Tucker-Vogel, Bureau of Water has this comment: No objections. Plans and specification should be submitted to KDHE review and approval.

PART III

RECOMMENDED ACTION COMMENTS:

☐ Clearance of the project should be granted.

☐ Clearance of the project should not be granted.

☐ Clearance of the project should be delayed until the issues or questions above have been clarified.

☐ Request a State Process Recommendation in concurrence with the above comments

☒ Clearance of the project should not be delayed but the Applicant should (in the final application) address and clarify the question or concerns indicated above.

☐ Request the opportunity to review final application prior to submission to the federal funding agency.

DIVISIONS/ AGENCY/ COMMISSION

A handwritten signature in black ink that reads "John W. Mitchell".

John W. Mitchell, Director
Division of Environment

JWM/df

Bureau of Environmental Remediation
Curtis State Office Building
1000 SW Jackson St., Suite 410
Topeka, KS 66612-1367



phone: 785-296-8025
fax: 785-559-4261
Kevin.Moon@ks.gov
www.kdheks.gov

Susan Mosier, MD, Secretary

Department of Health and Environment

Sam Brownback, Governor

MEMORANDUM

TO: Donna Fisher
FROM: Kevin Moon
DATE: December 28, 2016
RE: Intergovernmental Agency Review requested by Kramer Consulting, LLC for Water System Improvements in Frontenac, Crawford County, Kansas

The Kansas Department of Health and Environment Bureau of Environmental Remediation (KDHE/BER), Assessment and Restoration Section, Response and Remediation Unit, has no identified, contaminated Dry Cleaner or Superfund sites within the vicinity of the proposed project.

Staff members or representatives of Kramer Consulting, LLC are welcome to come and view the KDHE/BER files in accordance with the Kansas Open Records Act. Please contact me at 785-296-8025 or Kevin.Moon@ks.gov if you have any questions.

Donna Fisher

From: Gary Richards
Sent: Tuesday, January 17, 2017 3:32 PM
To: Donna Fisher
Cc: Jesse Branham; Bob Jurgens
Subject: Frontenac, Public Water Supply System Rehabilitation Project

Assessment and Restoration Section notes one facility in the project area which currently is under an Environmental Use Control. This property is located at 832 W. McKay Street (former McGraw Trucking). More information about this site can be obtained from the following link.

http://kansas.kdhe.state.ks.us/pls/SL/ISL_PUB_Detail?id=C301972493

Impacted surface soils were used as a base material for a parking lot. This resulted in unacceptable levels of dissolved metals being released as runoff. A removal action was completed in 2011 and an EUC was placed on the property restricting soils and shallow groundwater. No wells are allowed at this property.

The above proposed project should be granted clearance with knowing the former McGraw Trucking site location and its associated EUC boundaries (info available from link above).

Gary Richards
Unit Manager
Brownfields and Orphan Sites Unit
KDHE - Bureau of Environmental Remediation
Assessment & Restoration Section
1000 SW Jackson St., Suite 410
Topeka, Kansas 66612-1367

Telephone: 785.291.3246 • Fax: 785.296.4823
E-mail: gary.richards@ks.gov



This email and any files transmitted with it may be confidential or contain privileged information and are intended solely for the use of the individual or entity to which they are addressed. If you are not the intended recipient, please be advised that you have received this email in error and that any use, dissemination, forwarding, printing, or copying of this email and any attachments is strictly prohibited. If you have received this email in error, please immediately delete the email and any attachments from your system and notify the sender. Any other use of this e-mail is prohibited. Thank you for your compliance.

Donna Fisher

From: Maggie Weiser
Sent: Tuesday, January 03, 2017 11:02 AM
To: Donna Fisher
Subject: RE: Agency Review for Water Supply, Storage and Transmission Improvements, City of Frontenac, KS DUE date 1/13/2017
Attachments: Frontenac.pdf

Donna,

According to our files, there are three petroleum storage tank facilities noted in this area.

1. **City of Frontenac** (U3-019-00257) – one UST was removed in 1990. Contaminated soil was discovered and removed from the tank basin. The site was then closed.
2. **Dobrauc Oil** (U3-019-00256) – one UST was removed in 1990. No contamination was found and the site was closed. This UST was located on the same property as the above mentioned city UST.
3. **Raider Express, LLC** – there are two USTs in use at the facility. No releases have been reported

Maggie Weiser
KDHE-BER
785.296.1684
maggie.weiser@ks.gov

****please note my new email address****

From: Donna Fisher
Sent: Friday, December 23, 2016 5:08 PM
To: April Dixon <April.Dixon@ks.gov>; Gary Richards <Gary.Richards@ks.gov>; Glenna Drake <Glenna.Drake@ks.gov>; Javier Ahumada <Javier.Ahumada@ks.gov>; Kevin Moon <Kevin.Moon@ks.gov>; Maggie Weiser <Maggie.Weiser@ks.gov>; Mandi Chace <Mandi.Chace@ks.gov>; William Bider <William.Bider@ks.gov>
Cc: Cathy Tucker-Vogel <Cathy.Tucker-Vogel@ks.gov>
Subject: Agency Review for Water Supply, Storage and Transmission Improvements, City of Frontenac, KS DUE date 1/13/2017

Please review this project and submit your comments by 1/13.
Thank you.

Donna Fisher
Division Of Environment
Director's Office
1000 SW Jackson, Suite 400
Topeka, KS 66612

PLEASE NOTE NEW EMAIL:
donna.fisher@ks.gov

Phone: 785.291.3092

PLEASE NOTE MY NEW FAX NUMBER:
Fax: 785.559.4264



TRIBAL HISTORIC PRESERVATION OFFICE

Date: January 20, 2017

File: 1617-1667KS-12

RE: USDA RD Water Supply, Storage and Treatment Improvements in the City of Frontenac, Crawford County, Kansas

Kramer Consulting, LLC
Josh Kramer
4336 SE 37th Street
Topeka, KS 66605


Dear Mr. Kramer,

The Osage Nation Historic Preservation Office has evaluated your submission and concurs that the proposed USDA RD Water Supply, Storage and Treatment Improvements in the City of Frontenac, Crawford County, Kansas most likely will not adversely affect any sacred properties and/or properties of cultural significance to the Osage Nation. **The Osage Nation has no further concern with this project.**

In accordance with the National Historic Preservation Act, (NHPA) [54 U.S.C. § 300101 et seq.] 1966, undertakings subject to the review process are referred to in 54 U.S.C. § 302706 (a), which clarifies that historic properties may have religious and cultural significance to Indian tribes. Additionally, Section 106 of NHPA requires Federal agencies to consider the effects of their actions on historic properties (36 CFR Part 800) as does the National Environmental Policy Act (43 U.S.C. 4321 and 4331-35 and 40 CFR 1501.7(a) of 1969). **The Osage Nation concurs that the Kramer Consulting, LLC has fulfilled NHPA compliance by consulting with the Osage Nation Historic Preservation Office in regard to the proposed USDA RD Water Supply, Storage and Treatment Improvements in the City of Frontenac, Crawford County, Kansas.**

The Osage Nation has vital interests in protecting its historic and ancestral cultural resources. We do not anticipate that this project will adversely impact any cultural resources or human remains protected under the NHPA, NEPA, the Native American Graves Protection and Repatriation Act, or Osage law. **If, however, artifacts or human remains are discovered during project-related activities, we ask that activities cease immediately and the Osage Nation Historic Preservation Office be contacted.**

Should you have any questions or need any additional information please feel free to contact me at the number listed below. Thank you for consulting with the Osage Nation on this matter.


James Munkres
Archaeologist

TRIBAL
HISTORIC
PRESERVATION
OFFICE



P.O. BOX 167
CONCHO, OKLAHOMA 73022
1800-247-4612 Toll Free
405-422-7484 Telephone

January 10, 2017

Josh Kramer
Kramer Consulting
4336 SE 37th Street
Topeka, KS 66605

RE: City of Frontanac improvements to water supply, storage, and treatment plant

Dear Consultant:

On behalf of the Cheyenne and Arapaho Tribes, thank you for the notice of the referenced project. I have reviewed your Consultation request under section 106 of the National Historic Preservation Act regarding the project proposal and commented as follows:

At this time it is determined to be **No Properties**; however, if at any time during the project implementation inadvertent discoveries are made that reflect evidence of human remains, ceremonial or cultural objects, historical sites such as stone rings, burial mounds, village or battlefield artifacts, please discontinue work and notify the THPO Office immediately. If needed, we will contact the Tribes NAGPRA representatives.

Best Regards,

A handwritten signature in cursive script, appearing to read "Margaret Sutton".

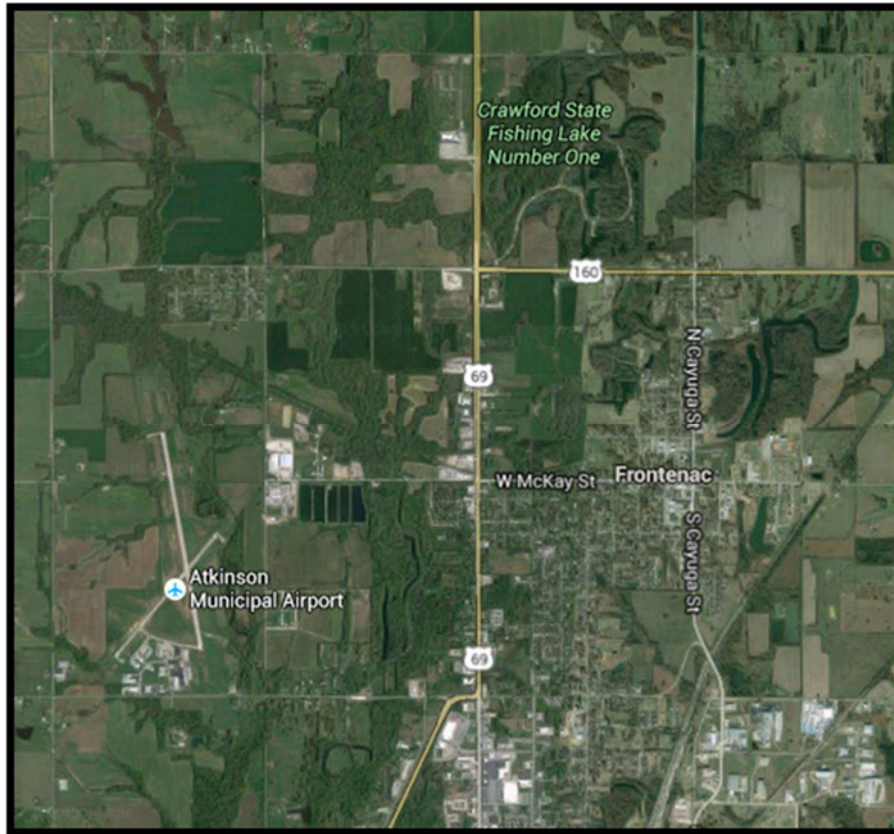
Margaret Sutton
Tribal Historic Preservation Officer
msutton@c-a-tribes.org
405-422-7484

CC: Max Bear
Culture and Heritage Director

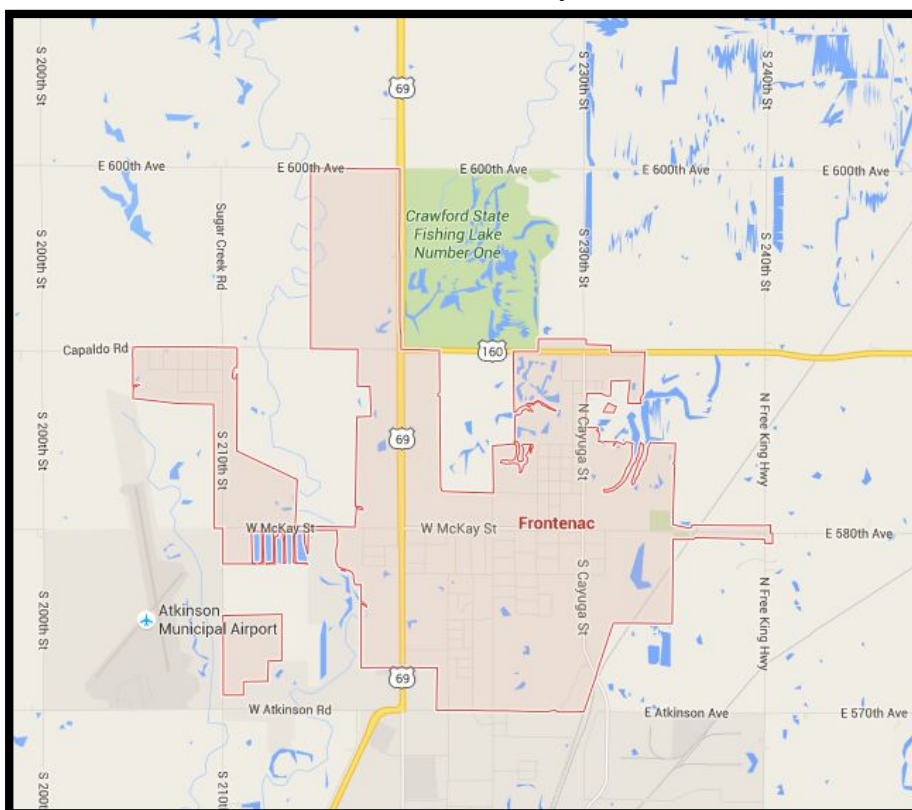
Section 6.0

Exhibits

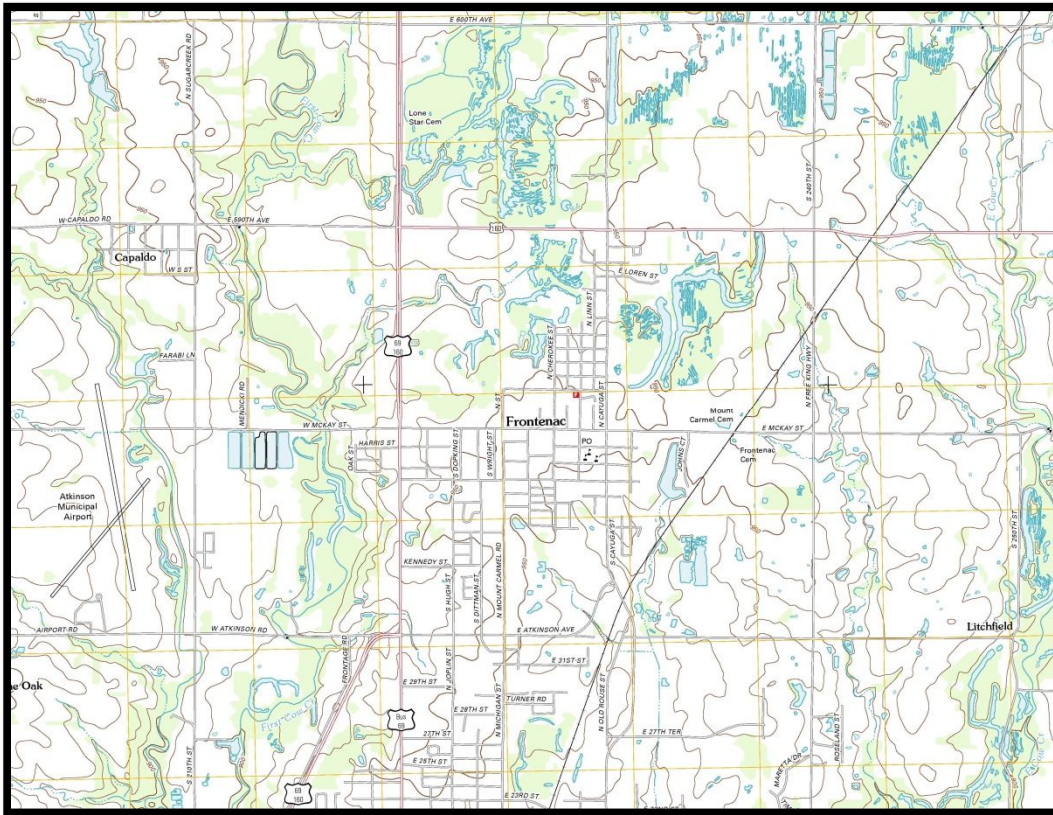
Aerial Photograph of Frontenac, Kansas



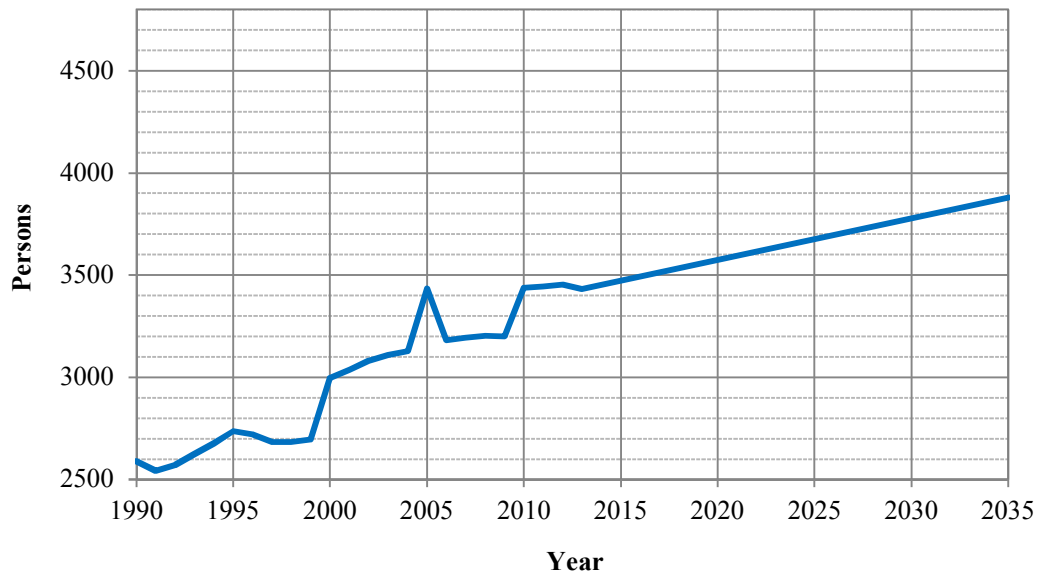
Frontenac, Kansas City Limits

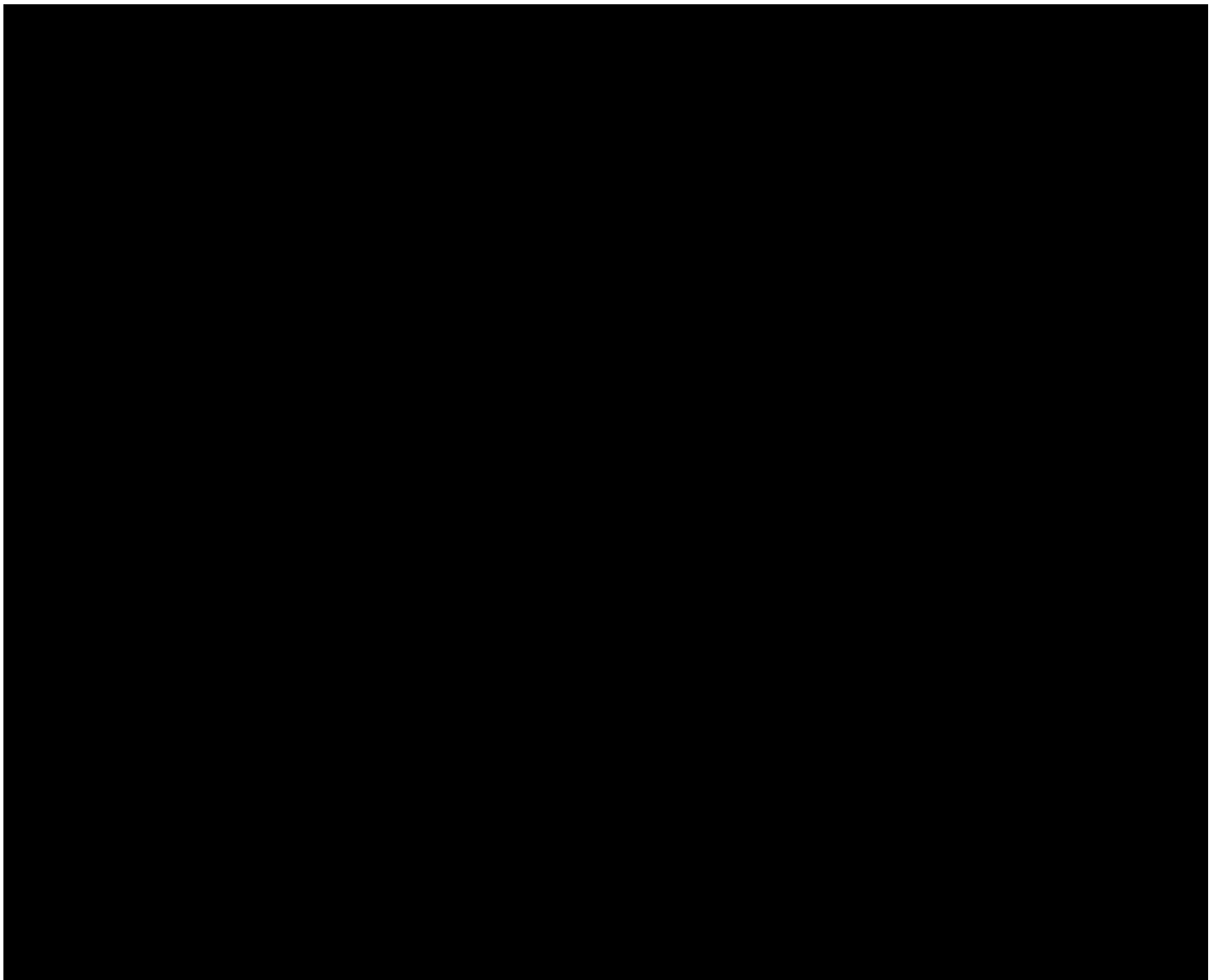


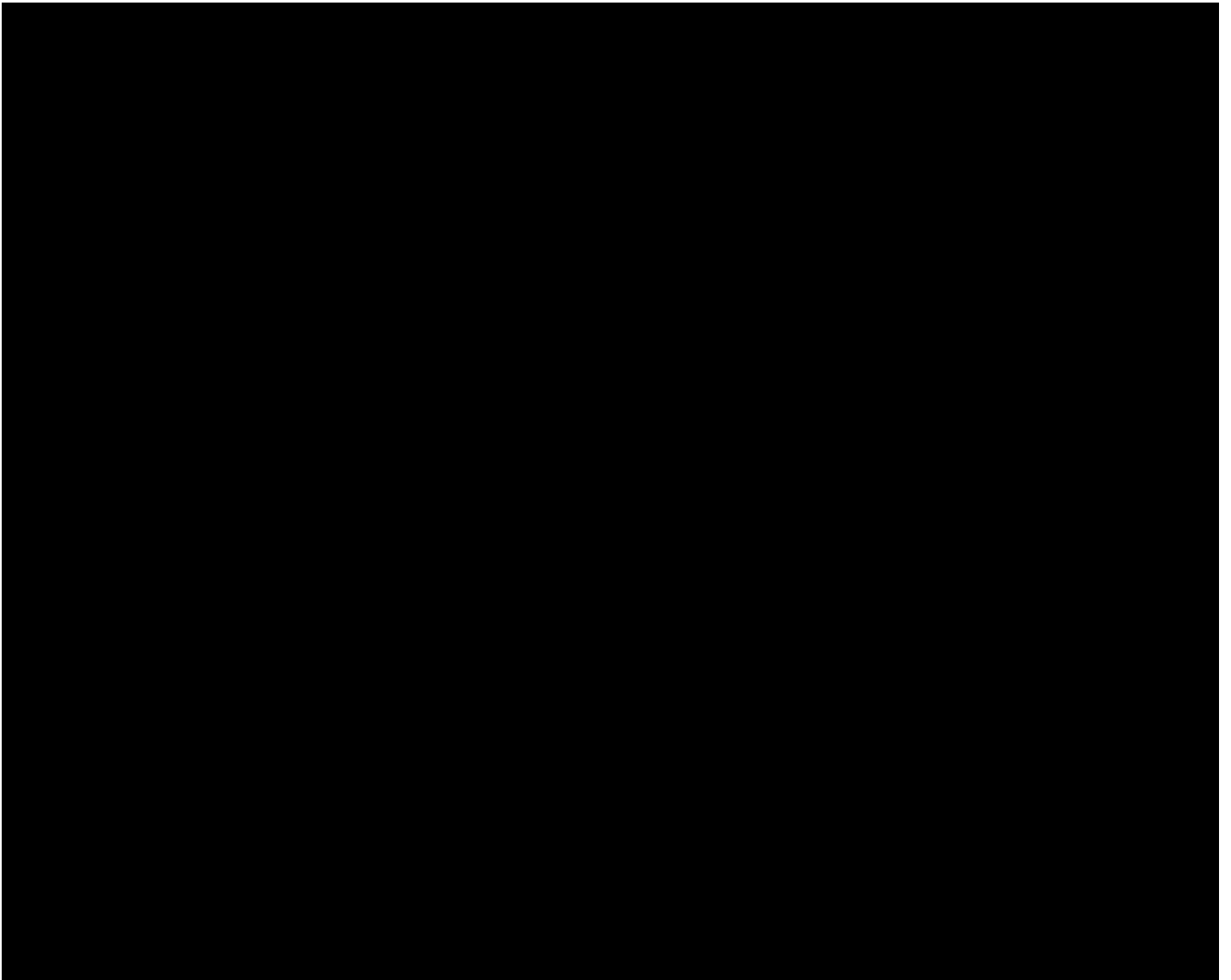
Topographic Map

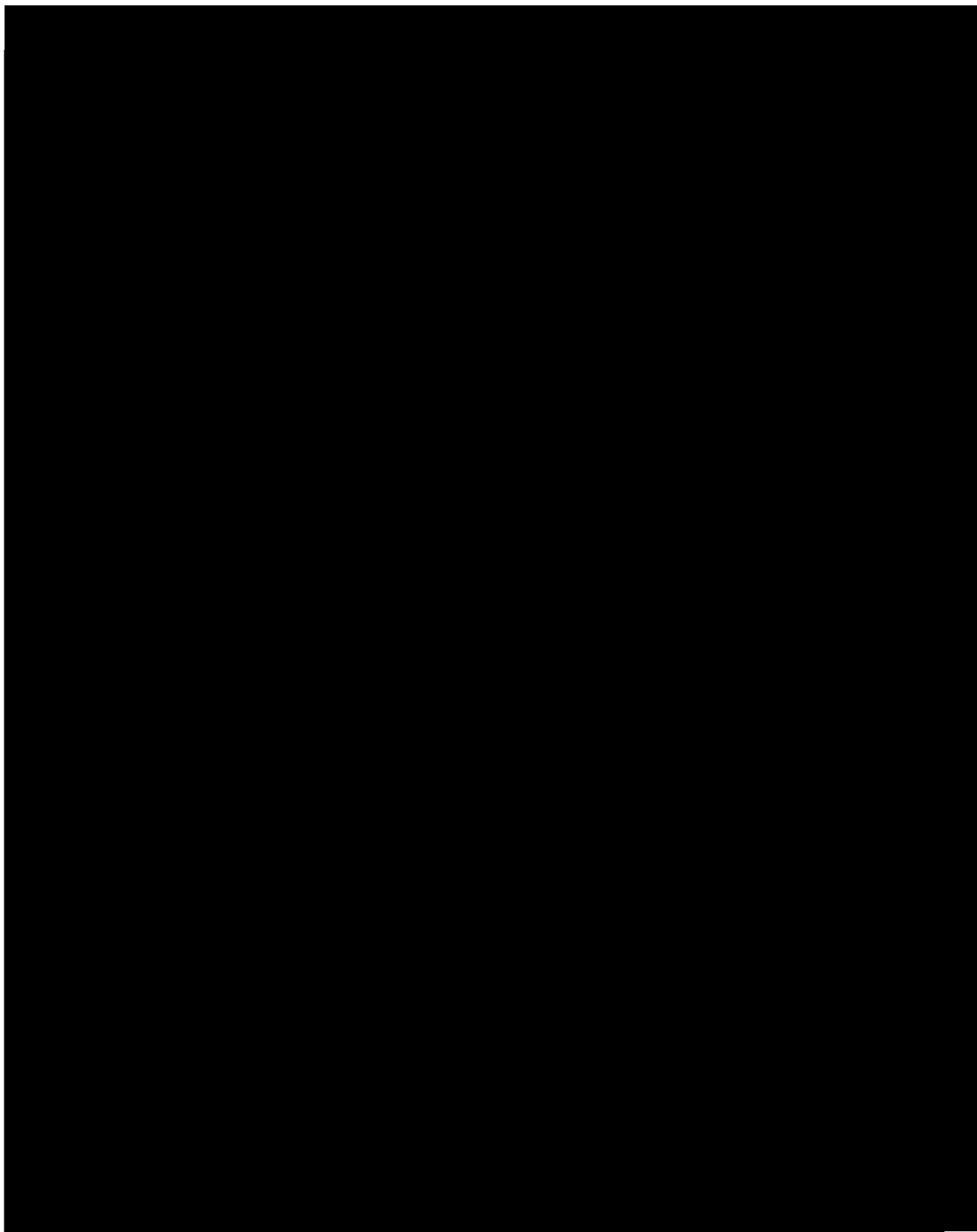


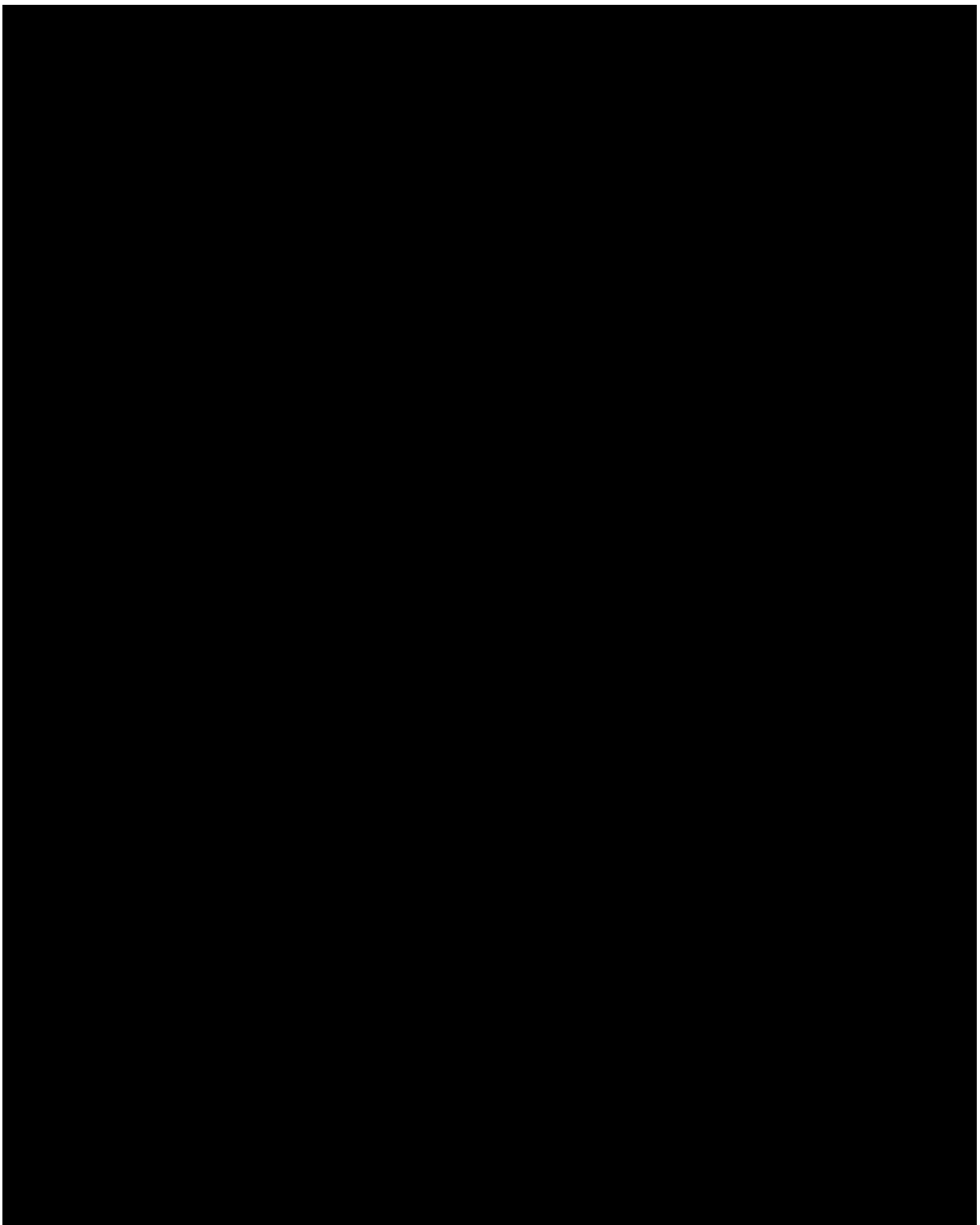
Population Trend in Frontenac











The Waste Stream Disposal report for the Water Treatment Plant has been included in this section as an exhibit.

KRAMER CONSULTING, LLC

Engineers – Planners – Surveyors

WASTE STREAM DISPOSAL

WATER TREATMENT PLANT

FOR

CITY OF FRONTENAC, KANSAS

Job No. 1422

May 6, 2016

WASTE STREAM DISPOSAL

WATER TREATMENT PLANT

OWNER:

CITY OF FRONTENAC, KANSAS

ENGINEERS:

**KRAMER CONSULTING, LLC
4336 SE 37th Street
Topeka, KS 66605
785-234-6600**



KRAMER CONSULTING, LLC

ENGINEERS • PLANNERS • SURVEYORS

4336 SE 37TH STREET • TOPEKA, KANSAS 66605

(785) 234-6600 • JACK@KRAMERLLC.NET

May 6, 2016

REPORT

Waste Stream Disposal - Water Treatment Plant

City of Frontenac, Kansas

The City of Frontenac is proposing water treatment plant improvements and upgrades in order to continue to provide reliable, adequate and safe drinking water for the City patrons. The proposed plant improvements and upgrades will not change the existing waste streams. However, the addition of a Hydrogen Sulfide (H₂S) air scrubber will produce an additional waste stream as outlined in this report.

Included as a part of this report is a Process Flow Diagram labeled Figure 1 showing the flow process, along with chemical feeding points, principal chemicals present and characterization for the waste streams generated. Also included is an aerial photo labeled Figure 2 showing the water treatment plant waste stream discharge route through the sanitary sewer collection system to the waste stabilization ponds.

The average water treatment plant run time, based on the design year 2035, is 11.5 hours per day at a plant operating rate of 700 gpm. The water treatment flow, as shown in Figure 1, starts from the existing water supply wells, pumped to the water treatment site through aerators, then injected with 12 lbs./day Cl₂. Once the water goes through the aerators, it flows through the chlorine contact basin which is designed for disinfection and settling out the hydrogen sulfide from the water. The water from the chlorine contact basin flows into the filter building, and through the water treatment filters. Water is then injected with post Cl₂ at 12 lbs./day while entering the clearwell. From the clearwell, treated water is then pumped to the City's water distribution system. With the addition of the H₂S air scrubber, air discharged from the aerators will go through a duct to the air scrubber. The air will be treated with 6 gallons/hour 25% NaOH and 42 gallons/hour 12.5% NaOCl in the air scrubber to help with hydrogen sulfide odor, then the air is released from the scrubber unit into atmosphere. No process water enters the H₂S air scrubber. The water treatment plant flow process can be seen on Figure 1, attached herein.

The City tests treated water for chlorine residuals in the laboratory. This is the only testing completed in the laboratory. There are no on-line analyzers. The drain located in the

laboratory is used when mopping the floor. There are no other floor drains located in the City's Water Treatment Plant.

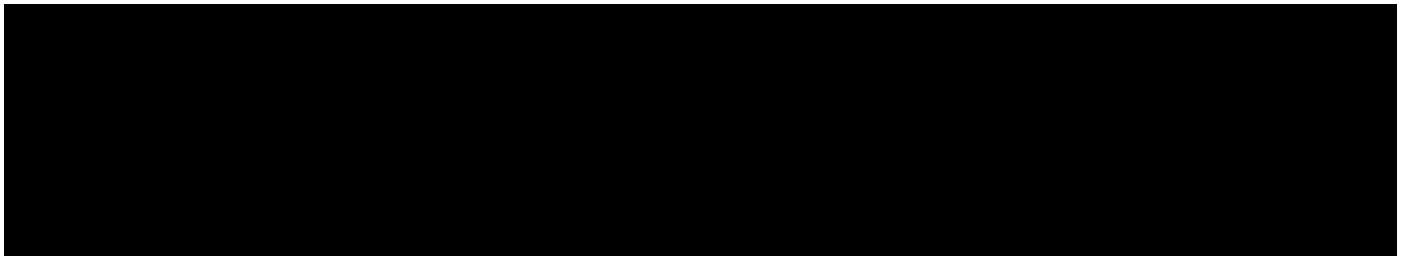
The plant discharges all process water waste streams to a Filter Backwash Waste Sump. Waste water from the Filter Backwash Waste Sump is then pumped out to a manhole located in the City's existing sanitary sewer collection system, then the waste gravity flows from that manhole to the City's existing First Cow Creek Pump Station and then re-pumped at the First Cow Creek Pump Station to the waste stabilization ponds (lagoons) for treatment.

The domestic waste stream gravity flows from the water treatment plant, north to the existing sanitary sewer along McKay street, and then flows through the gravity sewer collection system disposal path that the process water waste stream flows through.

The process water waste stream and the domestic water waste stream are not connected.

The process water waste stream, along with the domestic waste stream disposal path to the City's waste stabilization pond treatment system can be seen in Figure 2, attached herein.

The water treatment plant process and domestic waste streams are treated at the City's waste stabilization ponds. The ponds have a total surface area of 32.54 acres. The ponds are designed for 6,100 persons at 100 gallons per capita per day. The City currently serves approximately 3,400 persons. No large industries discharge to the City sewers.



The existing sanitary sewer collection system, Filter Backwash Waste Sump pumps and the First Cow Creek Pump Station pumps are adequately sized to handle existing waste streams and additional waste stream of 2,070 gallons per day from H₂S scrubber. The additional 2,070 gallons per day requires the First Cow Creek Pump Station to pump an additional 1 minute per day.

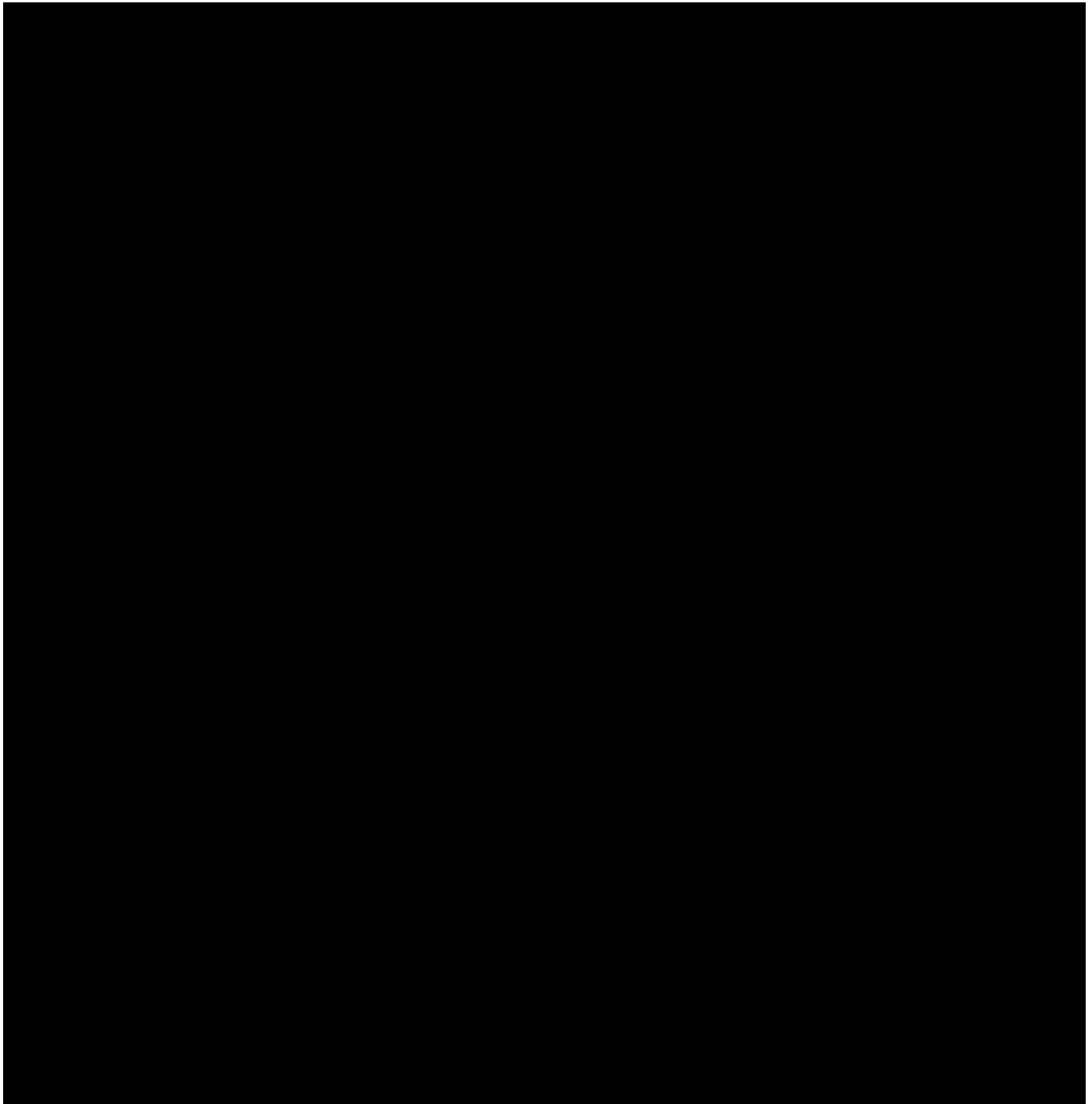
The two current water supply wells produce no inorganic or organic concentrations above the maximum contaminant level for drinking water. Table 1 below shows typical chemical well water analysis for Frontenac's wells:

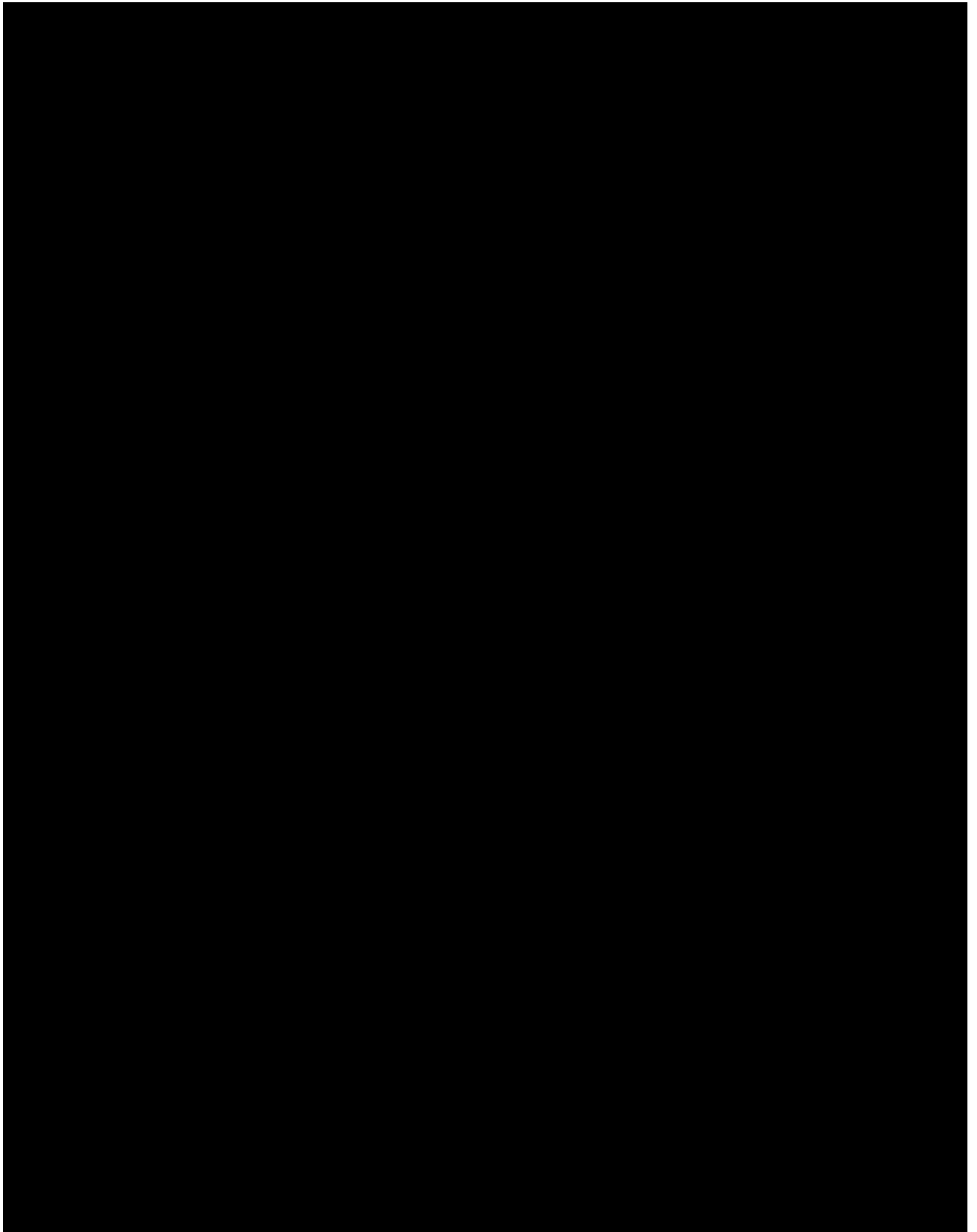
TABLE 1 <i>Well Water Supply Water Quality</i>		
Component	Well Water Supply	Units
Total Hardness, as CaCO ₃	240	mg/L
Calcium, as Ca	55	mg/L
Magnesium, as Mg	25	mg/L
Sodium	100	mg/L
Total Alkalinity, as CaCO ₃	200	mg/L
pH	7.8	pH s.u.
Specific Conductivity	1,060	umho/cm
Chloride	187	mg/L
Sulfate	35	mg/L
Nitrate, as NO ₃	0	mg/L
Fluoride	1	mg/L
Iron	0	mg/L
Manganese	0.002	mg/L
Total Dissolved Solids	551	mg/L
Arsenic	0.0002	mg/L
Barium	0.4	mg/L
Selenium	0	mg/L
Silica	11.2	mg/L
Aluminum	1	ug/L
Potassium	5	mg/L
Zinc	0.008	mg/L
Corrosivity	0.274	LANG
Gross Alpha	9	pCi/L
Radium 226	3	pCi/L
Radium 228	<1.0	pCi/L
Hydrogen Sulfide Gas	4.0-11.0	ppmv
Total Trihalomethanes (TTHM)	0.0027	mg/L
Haloacetic Acids (HAA5)	0.004	mg/L

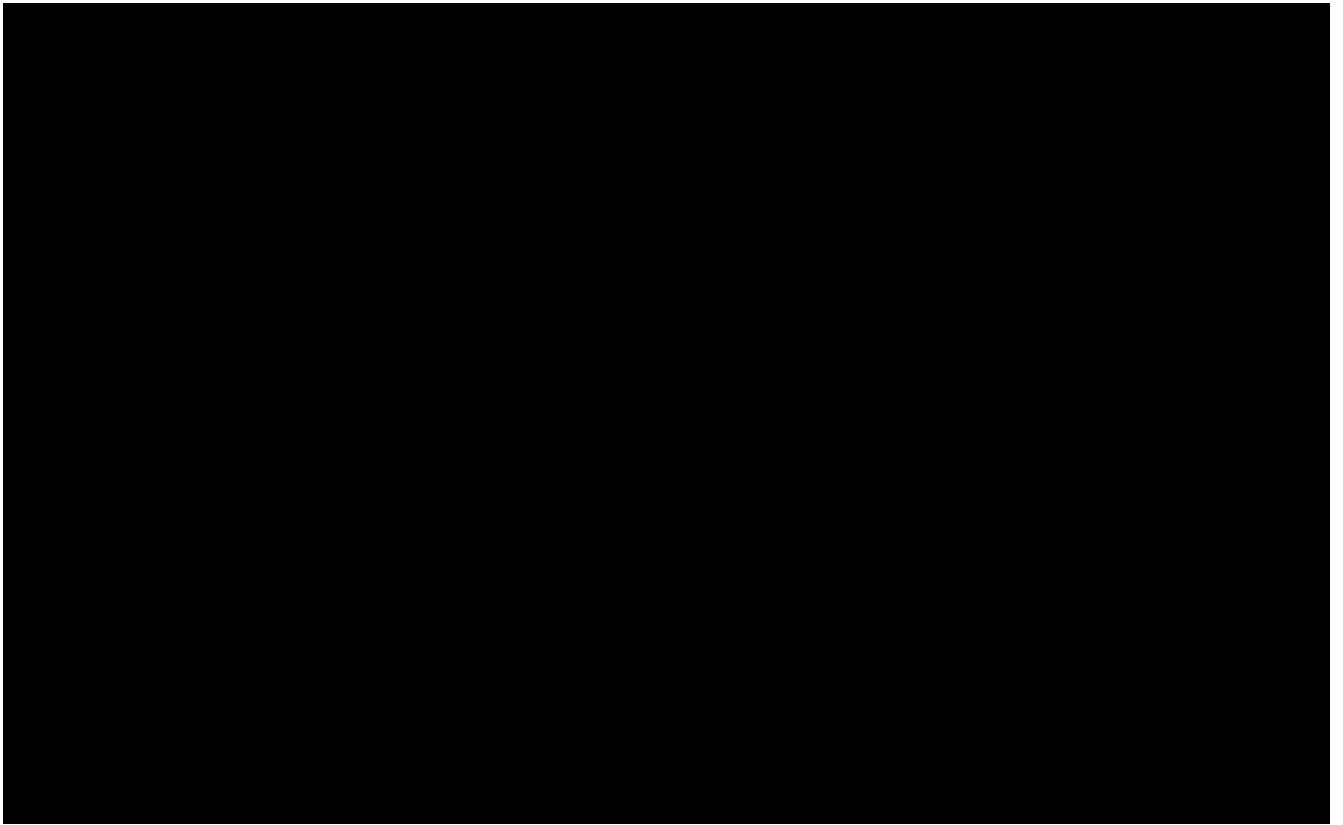
The following portion of the report explains waste streams produced from the existing water treatment plant and the addition of the H₂S air scrubber unit.

A. Existing Water Treatment Plant

Waste streams from the existing water treatment plant before the addition of the proposed H₂S Air Scrubber unit are as follows:



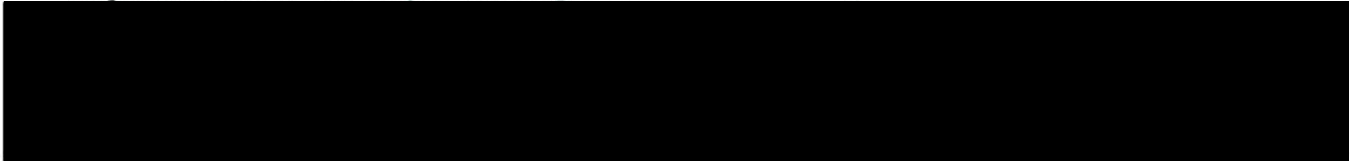




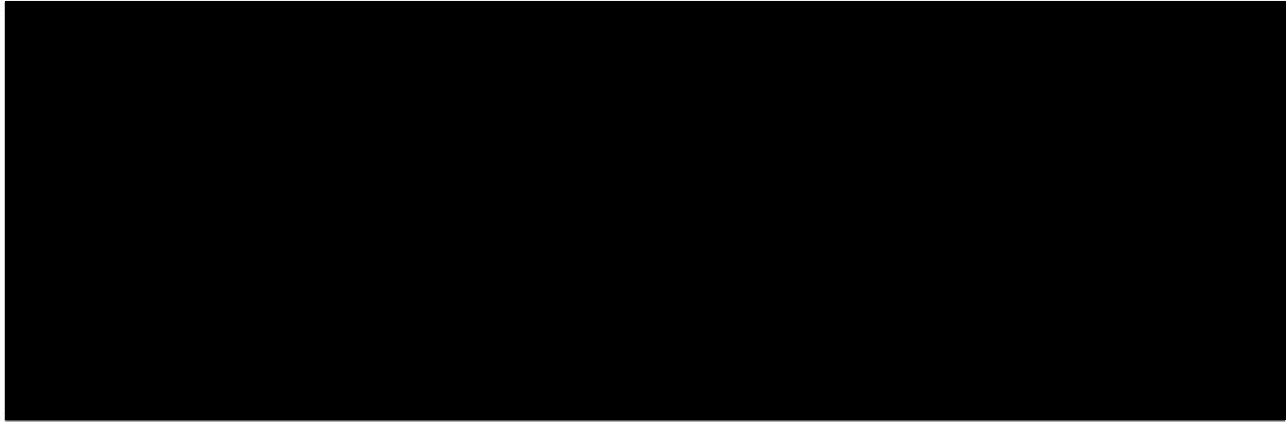
(The remainder of this page intentionally left blank)

C. Summary of Waste Streams

All waste streams after plant improvements are completed will be discharged and flow through the City's existing sanitary sewer collection system to the waste stabilization ponds for treatment. Process waste streams flow into the existing Filter Backwash Waste Sump and then pumped to an existing manhole in the sanitary sewer collection system. The domestic waste stream exits the building to the north and gravity flow to the existing sanitary sewer collection system along McKay street. Figure 2 attached herein shows the disposal route to the City's existing waste stabilization pond treatment system, where all



improved water treatment plant waste streams, and no significant increase in waste treatment cost.



Respectfully Submitted,

KRAMER CONSULTING, LLC

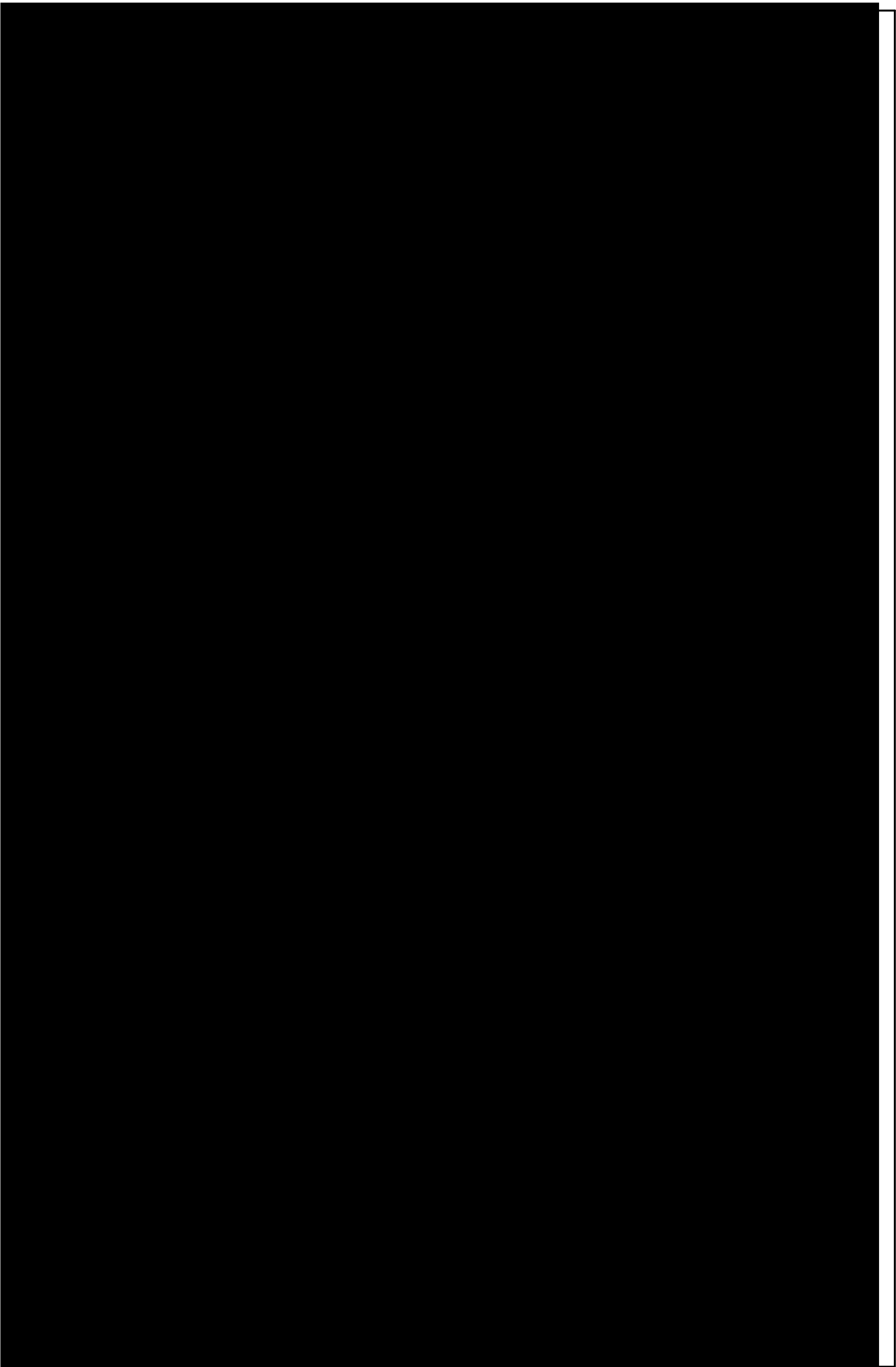


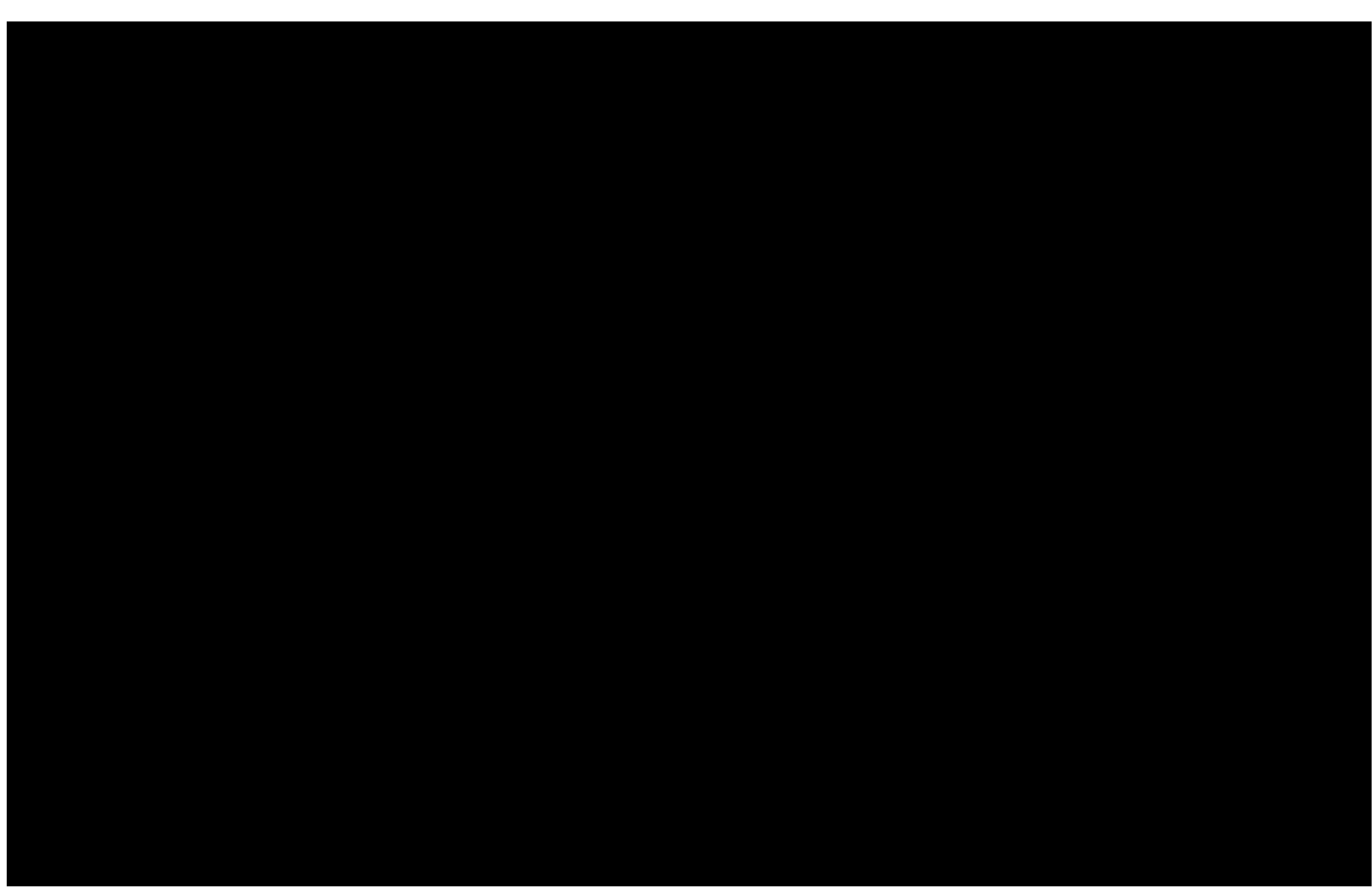
Josh B. Kramer, E.I.T.
Engineering Tech

KRAMER CONSULTING, LLC



John P. "Jack" Kramer, P.E.
Principal



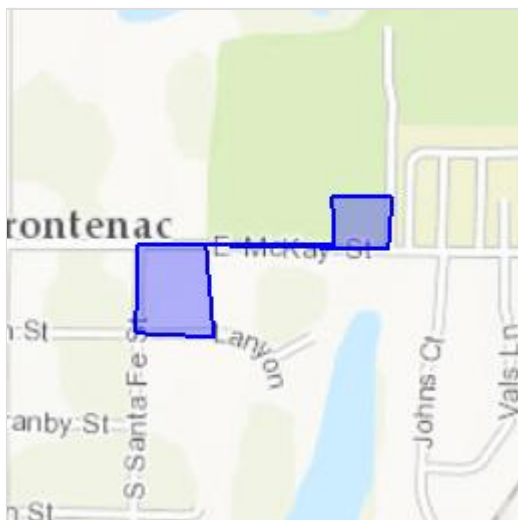


IPaC**U.S. Fish & Wildlife Service**

IPaC resource list

Location

Crawford County, Kansas



Local office

Kansas Ecological Services Field Office

(785) 539-3474

(785) 539-8567

2609 Anderson Avenue

Manhattan, KS 66502-2801

Endangered species

This resource list is for informational purposes only and should not be used for planning or analyzing project level impacts.

[Section 7](#) of the Endangered Species Act **requires** Federal agencies to “*request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action*” for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Review section in IPaC or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by creating a project and making a request from the Regulatory Review section.

Listed species

¹ are managed by the [Endangered Species Program](#) of the U.S. Fish and Wildlife Service.

1. Species listed under the [Endangered Species Act](#) are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information.

The following species are potentially affected by activities in this location:

Flowering Plants

NAME	STATUS
Mead's Milkweed <i>Asclepias meadii</i> No critical habitat has been designated for this species. http://ecos.fws.gov/ecp/species/8204	Threatened

Mammals

NAME	STATUS
Gray Bat <i>Myotis grisescens</i> No critical habitat has been designated for this species. http://ecos.fws.gov/ecp/species/6329	Endangered
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. http://ecos.fws.gov/ecp/species/9045	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Birds are protected under the Migratory Bird Treaty Act

¹ and the Bald and Golden Eagle Protection Act².

Any activity that results in the take (to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service

³. There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

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1. The [Migratory Birds Treaty Act](#) of 1918.
 2. The [Bald and Golden Eagle Protection Act](#) of 1940.
 3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Conservation measures for birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Year-round bird occurrence data <http://www.birdscanada.org/birdmon/default/datasummaries.jsp>

The migratory birds species listed below are species of particular conservation concern (e.g. [Birds of Conservation Concern](#)) that may be potentially affected by activities in this location, not a list of every bird species you may find in this location. Although it is important to try to avoid and minimize impacts to all birds, special attention should be made to avoid and minimize impacts to birds of priority concern. To view available data on other bird species that may occur in your project area, please visit the [AKN Histogram Tools](#) and [Other Bird Data Resources](#).

NAME	SEASON(S)
Acadian Flycatcher <i>Empidonax virescens</i>	Breeding
Bald Eagle <i>Haliaeetus leucocephalus</i> http://ecos.fws.gov/ecp/species/1626	Year-round
Bell's Vireo <i>Vireo bellii</i> http://ecos.fws.gov/ecp/species/9507	Breeding
Bewick's Wren <i>Thryomanes bewickii</i> ssp. <i>bewickii</i>	Year-round
Black-billed Cuckoo <i>Coccyzus erythrophthalmus</i> http://ecos.fws.gov/ecp/species/9399	Breeding
Black-crowned Night-heron <i>Nycticorax nycticorax</i> http://ecos.fws.gov/ecp/species/6487	Breeding
Blue-winged Warbler <i>Vermivora pinus</i>	Breeding
Dickcissel <i>Spiza americana</i>	Breeding
Field Sparrow <i>Spizella pusilla</i>	Year-round
Fox Sparrow <i>Passerella iliaca</i>	Wintering
Golden Eagle <i>Aquila chrysaetos</i> http://ecos.fws.gov/ecp/species/1680	Wintering

Grasshopper Sparrow <i>Ammodramus</i> <i>savannarum</i> http://ecos.fws.gov/ecp/species/8879	Breeding
Harris's Sparrow <i>Zonotrichia</i> <i>querula</i>	Wintering
Henslow's Sparrow <i>Ammodramus</i> <i>henslowii</i> http://ecos.fws.gov/ecp/species/3941	Breeding
Hudsonian Godwit <i>Limosa</i> <i>haemastica</i>	Migrating
Kentucky Warbler <i>Oporornis</i> <i>formosus</i>	Breeding
Least Bittern <i>Ixobrychus</i> <i>exilis</i> http://ecos.fws.gov/ecp/species/6175	Breeding
Loggerhead Shrike <i>Lanius</i> <i>ludovicianus</i> http://ecos.fws.gov/ecp/species/8833	Year-round
Northern Flicker <i>Colaptes</i> <i>auratus</i>	Year-round
Painted Bunting <i>Passerina</i> <i>ciris</i>	Breeding
Prothonotary Warbler <i>Protonotaria</i> <i>citrea</i>	Breeding
Red-headed Woodpecker <i>Melanerpes</i> <i>erythrocephalus</i>	Year-round
Rusty Blackbird <i>Euphagus</i> <i>carolinus</i>	Wintering
Short-eared Owl <i>Asio</i> <i>flammeus</i> http://ecos.fws.gov/ecp/species/9295	Wintering
Swainson's Hawk <i>Buteo</i> <i>swainsoni</i> http://ecos.fws.gov/ecp/species/1098	Breeding

Upland Sandpiper <i>Bartramia longicauda</i> http://ecos.fws.gov/ecp/species/9294	Breeding
Willow Flycatcher <i>Empidonax traillii</i> http://ecos.fws.gov/ecp/species/3482	Breeding
Wood Thrush <i>Hylocichla mustelina</i>	Breeding
Worm Eating Warbler <i>Helmitheros vermivorum</i>	Breeding

What does IPaC use to generate the list of migratory bird species potentially occurring in my specified location?

Landbirds:

Migratory birds that are displayed on the IPaC species list are based on ranges in the latest edition of the National Geographic Guide, Birds of North America (6th Edition, 2011 by Jon L. Dunn, and Jonathan Alderfer). Although these ranges are coarse in nature, a number of U.S. Fish and Wildlife Service migratory bird biologists agree that these maps are some of the best range maps to date. These ranges were clipped to a specific Bird Conservation Region (BCR) or USFWS Region/Regions, if it was indicated in the 2008 list of Birds of Conservation Concern (BCC) that a species was a BCC species only in a particular Region/Regions. Additional modifications have been made to some ranges based on more local or refined range information and/or information provided by U.S. Fish and Wildlife Service biologists with species expertise. All migratory birds that show in areas on land in IPaC are those that appear in the 2008 Birds of Conservation Concern report.

Atlantic Seabirds:

Ranges in IPaC for birds off the Atlantic coast are derived from species distribution models developed by the National Oceanic and Atmospheric Association (NOAA) National Centers for Coastal Ocean Science (NCCOS) using the best available seabird survey data for the offshore Atlantic Coastal region to date. NOAA/NCCOS assisted USFWS in developing seasonal species ranges from their models for specific use in IPaC. Some of these birds are not BCC species but were of interest for inclusion because they may occur in high abundance off the coast at different times throughout the year, which potentially makes them more susceptible to certain types of development and activities taking place in that area. For more refined details about the abundance and richness of bird species within your project area off the Atlantic Coast, see the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other types of taxa that may be helpful in your project review.

About the NOAA/NCCOS models: the models were developed as part of the NOAA/NCCOS project: [Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#). The models resulting from this project are being used in a number of decision-support/mapping products in order to help guide decision-making on activities off the Atlantic

Coast with the goal of reducing impacts to migratory birds. One such product is the [Northeast Ocean Data Portal](#), which can be used to explore details about the relative occurrence and abundance of bird species in a particular area off the Atlantic Coast.

All migratory bird range maps within IPaC are continuously being updated as new and better information becomes available.

Can I get additional information about the levels of occurrence in my project area of specific birds or groups of birds listed in IPaC?

Landbirds:

The [Avian Knowledge Network \(AKN\)](#) provides a tool currently called the "Histogram Tool", which draws from the data within the AKN (latest, survey, point count, citizen science datasets) to create a view of relative abundance of species within a particular location over the course of the year. The results of the tool depict the frequency of detection of a species in survey events, averaged between multiple datasets within AKN in a particular week of the year. You may access the histogram tools through the [Migratory Bird Programs AKN Histogram Tools](#) webpage.

The tool is currently available for 4 regions (California, Northeast U.S., Southeast U.S. and Midwest), which encompasses the following 32 states: Alabama, Arkansas, California, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Vermont, Virginia, West Virginia, and Wisconsin.

In the near future, there are plans to expand this tool nationwide within the AKN, and allow the graphs produced to appear with the list of trust resources generated by IPaC, providing you with an additional level of detail about the level of occurrence of the species of particular concern potentially occurring in your project area throughout the course of the year.

Atlantic Seabirds:

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS [Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project](#) webpage.

Facilities

Wildlife refuges

Any activity proposed on [National Wildlife Refuge](#) lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGES AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

THERE ARE NO KNOWN WETLANDS AT THIS LOCATION.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Not for
consultation



Key to the Northern Long-Eared Bat 4(d) Rule for Federal Actions that May Affect Northern Long-Eared Bats

A separate key is available for non-federal activities

Federal agency actions that involve incidental take not prohibited under the final 4(d) rule may result in effects to individual northern long-eared bats. Per section 7 of the Act, if a federal agency's action may affect a listed species, consultation with the Service is required. This requirement does not change when a 4(d) rule is implemented. However, for this 4(d) rule, the Service proposed a framework to streamline section 7 consultations when federal actions may affect the northern long-eared bat but will not cause prohibited take. Federal agencies have the option to rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities by using the framework. This key will help federal agencies determine if their actions may cause prohibited incidental take of northern long-eared bats as defined in the 4(d) rule under the Endangered Species Act and if separate section 7 consultation may be necessary. Also, the framework for streamlining northern long-eared bat section 7 consultation is provided.

1. Have you determined that the proposed action will have “no effect” on the northern long-eared bat?



Yes, the proposed action will have “no effect” on the northern long-eared bat.

When the action agency determines its proposed action will not affect a listed species, there is no need to coordinate further with the Service. If the northern long-eared bat will not be exposed directly or indirectly to the proposed action or any resulting environmental changes, an agency should conclude "no effect" and document the finding and this completes the section 7 process. For example, if suitable habitat is not present in the action area and the project does not otherwise present a risk to the species, conclude "species not present" and document your finding.



No, the proposed action “may affect” the northern long-eared bat or individual northern long-eared bats.

Continue to #2

2. Will your activity purposefully take (see Definitions below) northern long-eared bats? For example, are you removing bats from a human structure or capturing bats for research?



Yes, my activity includes purposefully taking northern long-eared bats.

- Removing bats from human structures is not prohibited and take of northern long-eared bats as required for public health monitoring (disease testing) is not prohibited. The federal agency can rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities if they use the framework described below. This framework is

optional, if the federal agency chooses not to follow the framework, standard section 7 consultation procedures apply.

- Research that involves handling bats does require a permit after May 4, 2016; if you are conducting research that includes capturing and handling northern long-eared bats, you should contact the U.S. Fish and Wildlife Service to apply for a permit. www.fws.gov/endangered/regions
- Other purposeful take (see Definitions below) of northern long-eared bats is prohibited. You should contact the U.S. Fish and Wildlife Service as the standard section 7 consultation procedures apply.

☐ **No, my activity does not include purposefully taking northern long-eared bats.**
Continue to #3.

3. Is the action area (i.e., the area affected by all direct and indirect project effects) located wholly outside the White-nose Syndrome Zone? For the most current version of the White-nose Syndrome Zone map, please see www.fws.gov/midwest/endangered/mammals/nleb/pdf/WNSZone.pdf

☐ **Yes, the action area is located wholly outside the white-nose syndrome zone.**
[Incidental take](#) (see Definitions below) of northern long-eared bats is not prohibited in areas outside the White-nose Syndrome Zone. The federal agency can rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities if they use the framework described below. This framework is optional, if the federal agency chooses not to follow the framework, standard section 7 consultation procedures apply.

☐ **No, the action area is located partially or wholly inside the white-nose syndrome zone.**
Continue to #4

4. Will the action take affect caves or mines where northern long-eared bats are known to hibernate (i.e., hibernaculum) or could it alter the entrance or the environment (physical or other alteration) of a hibernaculum?

☐ **Yes, the action will affect a northern long-eared bat hibernaculum or it could alter the entrance or the environment (physical or other alteration) of a hibernaculum.**
[Take](#) (see Definitions below) of northern long-eared bats within hibernacula is prohibited, including actions that may change the nature of the hibernaculum's environment or entrance to it, even when the bats are not present. If your activity includes work in a hibernaculum or it could alter its entrance or environment, please contact the Service's Ecological Services Field Office located nearest to the project area. To find contact information for the Ecological Services Field Offices, please see www.fws.gov/offices.

- ☐ **No, the action will not take place within a northern long-eared bat hibernaculum or alter its entrance or environment.**
Continue to #5

5. Will the action involve tree removal (see definition below)?

- ☐ **No, the action does not include tree removal.**
[Incidental take](#) (see Definitions below) from activities that do not involve tree removal and do not take place within hibernacula or would not alter the hibernaculum's entrance or environment (see Question #4), is not prohibited. The federal agency can rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities if they use the framework described below. This framework is optional, if the federal agency chooses not to follow the framework, standard section 7 consultation procedures apply.
- ☐ **Yes, the action involves tree removal.**
Continue to #6

6. Is the action the removal of hazardous trees for protection of human life or property?

- ☐ **Yes, the action is removing hazardous trees.**
[Incidental take](#) (see Definitions below) of northern long-eared bats as a result of hazardous tree removal is not prohibited. The federal agency can rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities if they use the framework described below. This framework is optional, if the federal agency chooses not to follow the framework, standard section 7 consultation procedures apply.
- ☐ **No, the action is not removing hazardous trees.**
Continue to #7

7. Will the action include one or both of the following: 1) removing a northern long-eared bat known occupied maternity roost tree or any trees within 150 feet of a known occupied maternity roost tree from June 1 through July 31; or 2) removing any trees within 0.25 miles of a northern long-eared bat hibernaculum at any time of year?

- ☐ **No**
[Incidental take](#) (see Definitions below) from tree removal activities is not prohibited unless it results from removing a known occupied maternity roost tree or from tree removal activities within 150 feet of a known occupied maternity roost tree from June 1 through July 31 or results from tree removal activities within 0.25 mile of a hibernaculum at any time. The federal agency can rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities if they use the framework described below. This framework is optional, if the federal agency chooses not to follow the framework, standard section 7 consultation procedures apply.



Yes

Incidental take (see Definitions below) of northern long-eared bats is prohibited if it occurs as a result of removing a known occupied maternity roost tree or removing trees within 150 feet of a known occupied maternity roost tree during the pup season from June 1 through July 31 or as a result of removing trees from within 0.25 mile of a hibernaculum at any time of year. This does not mean that you cannot conduct your action; however, standard section 7 consultation procedures apply. Please contact your nearest Ecological Services Field Office. To find contact information for the Ecological Services Field Offices, please see www.fws.gov/offices

How do I know if there is a maternity roost tree or hibernacula in the action area?

We acknowledge that it can be difficult to determine if a maternity roost tree or a hibernaculum is in your project area. Location information for both resources is generally kept in state Natural Heritage Inventory databases – the availability of this data varies state-by-state. Many states provide online access to their data, either directly by providing maps or by providing the opportunity to make a data request. In some cases, to protect those resources, access to the information may be limited. A web page with links to state Natural Heritage Inventory databases is available at www.fws.gov/midwest/endangered/mammals/nleb/nhisites.html.

When looking for information on the presence of maternity roost trees or hibernacula within your project area, our expectation is that the federal action agency will complete due diligence to determine if data is available. If information is not available, document your attempt to find the information and send it with your determination under step 1 of the framework (see below).

We do not require federal agencies to conduct surveys; however, we recommend that surveys be conducted whenever possible. Surveys will help federal agencies meet their responsibilities under section 7(a)(1) of the Act. Active participation of federal agencies in survey efforts will lead to a more effective conservation strategy for the northern long-eared bat. In addition, should the Service reclassify the species as endangered in the future, an agency with a good understanding of how the species uses habitat based on surveys within its action areas could have greater flexibility under section 7(a)(2) of the Act. Recommended survey methods are available at www.fws.gov/midwest/endangered/mammals/nleb.

Definitions

“Incidental take” is defined by the Endangered Species Act as take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity." For example, harvesting trees can kill bats that are roosting in the trees, but the purpose of the activity is not to kill bats.

“Known hibernacula” are defined as locations where one or more northern long-eared bats have been detected during hibernation or at the entrance during fall swarming or spring emergence. Given the challenges of surveying for northern long-eared bats in the winter, any hibernacula with northern long-eared bats observed at least once, will continue to be considered “known hibernacula” as long as the hibernacula remains suitable for northern long-eared bat.

“Known occupied maternity roost trees” is defined in the 4(d) rule as trees that have had female northern long-eared bats or juvenile bats tracked to them or the presence of female or juvenile bats is known as a result of other methods. Once documented, northern-long eared bats are known to continue to use the same roosting areas. Therefore, a tree will be considered to be a “known occupied maternity roost” as long as the tree and surrounding habitat remain suitable for northern long-eared bat. The incidental take prohibition for known occupied maternity roosts trees applies only during the pup season (June 1 through July 31).

“Purposeful take” is when the reason for the activity or action is to conduct some form of take. For instance, conducting a research project that includes collecting and putting bands on bats is a form of purposeful take. Intentionally killing or harming bats is also purposeful take and is prohibited.

“Take” is defined by the ESA as ‘to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect’ any endangered species. Purposeful take is when the reason for the activity or action is to conduct some form of take. For instance, conducting a research project that includes collecting and putting bands on bats is a form of purposeful take.

“Tree removal” is defined in the 4(d) rule as cutting down, harvesting, destroying, trimming, or manipulating in any other way the trees, saplings, snags, or any other form of woody vegetation likely to be used by northern long-eared bats.

Optional Framework to Streamline Section 7 Consultation for the Northern Long-Eared Bat

The primary objective of the framework is to provide an efficient means for U.S. Fish and Wildlife Service verification of federal agency determinations that their proposed actions are consistent with those evaluated in the programmatic intra-Service consultation for the final 4(d) rule and do not require separate consultation. Such verification is necessary because incidental take is prohibited in the vicinity of known hibernacula and known roosts, and these locations are continuously updated. Federal agencies may rely on this Biological Opinion to fulfill their project-specific section 7(a)(2) responsibilities under the following framework:

1. For all federal activities that may affect the northern long-eared bat, the action agency will provide project-level documentation describing the activities that are excepted from incidental take prohibitions and addressed in this consultation. The federal agency must provide written documentation to the appropriate Service Field Office when it is determined their action may affect (i.e., not likely to adversely affect or likely to adversely affect) the northern long-eared bat, but would not cause prohibited incidental take. This documentation must follow these procedures:
 - a. In coordination with the appropriate Service Field Office, each action agency must make a determination as to whether their activity is excepted from incidental taking prohibitions in the final 4(d) rule. Activities that will occur within 0.25 mile of a known hibernacula or within 150 feet of known, occupied maternity roost trees during the pup season (June 1 to July 31) are not excepted pursuant to the final 4(d) rule. This determination must be updated annually for multi-year activities.
 - b. At least 30 days in advance of funding, authorizing, or carrying out an action, the federal agency must provide written notification of their determination to the appropriate Service Field Office.
 - c. For this determination, the action agency will rely on the definitions of prohibited activities provided in the final 4(d) rule and the activities considered in this consultation.
 - d. The determination must include a description of the proposed project and the action area (the area affected by all direct and indirect project effects) with sufficient detail to support the determination.
 - e. The action agency must provide its determination as part of a request for coordination or consultation for other listed species or separately if no other species may be affected.
 - f. Service concurrence with the action agency determination is not required, but the Service may advise the action agency whether additional information indicates consultation for the northern long-eared bat is required; i.e., where the proposed project includes an activity not covered by the 4(d) rule and thus not addressed in the Biological Opinion and is subject to additional consultation.

- g. If the Service does not respond within 30 days under (f) above, the action agency may presume its determination is informed by best available information and consider its project responsibilities under section 7(a)(2) with respect to the northern long-eared bat fulfilled through this programmatic Biological Opinion.

2. Reporting

- a. For monitoring purposes, the Service will assume all activities are conducted as described. If an agency does not conduct an activity as described, it must promptly report and describe such departures to the appropriate Service Field Office.
- b. The action agency must provide the results of any surveys for the northern long-eared bat to the appropriate Service Field Office within their jurisdiction.
- c. Parties finding a dead, injured, or sick northern long-eared bat must promptly notify the appropriate Service Field Office.

If a Federal action agency chooses not to follow this framework, standard section 7 consultation procedures will apply.

Section 7(a)(1) of the Act directs Federal agencies, in consultation with and with the assistance of the Secretary (a function delegated to the Service), to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Service Headquarters provides to federal action agencies who choose to implement the framework described above several conservation recommendations for exercising their 7(a)(1) responsibility in this context. Conservation recommendations are discretionary federal agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. Service Headquarters recommends that the following conservation measures to all Federal agencies whose actions may affect the northern long-eared bat:

1. Perform northern long-eared bat surveys according to the most recent Range-wide Indiana Bat/ northern long-eared bat Summer Survey Guidelines. Benefits from agencies voluntarily performing northern long-eared bat surveys include:
 - a. Surveys will help federal agencies meet their responsibilities under section 7(a)(1) of the Act. The Service and partners will use the survey data to better understand habitat use and distribution of northern long-eared bats, track the status of the species, evaluate threats and impacts, and develop effective conservation and recovery actions. Active participation of federal agencies in survey efforts will lead to a more effective conservation strategy for the northern long-eared bat.
 - b. Should the Service reclassify the species as endangered in the future, an agency with a good understanding of how the species uses habitat based on surveys within its action areas could inform greater flexibility under section 7(a)(2) of the Act. Such information could facilitate an expedited consultation and incidental take statement that may, for example, exempt taking associated with tree removal during the active season, but outside of the pup season, in known occupied habitat.

2. Apply additional voluntary conservation measures, where appropriate, to reduce the impacts of activities on northern long-eared bats. Conservation measures include:
 - a. Conduct tree removal activities outside of the northern long-eared bat pup season (June 1 to July 31) and/or the active season (April 1 to October 31). This will minimize impacts to pups at roosts not yet identified.
 - b. Avoid clearing suitable spring staging and fall swarming habitat within a 5-mile radius of known or assumed northern long-eared bat hibernacula during the staging and swarming seasons (April 1 to May 15 and August 15 to November 14, respectively).
 - c. Manage forests to ensure a continual supply of snags and other suitable maternity roost trees.
 - d. Conduct prescribed burns outside of the pup season (June 1 to July 31) and/or the active season (April 1 to October 31). Avoid high-intensity burns (causing tree scorch higher than northern long-eared bat roosting heights) during the summer maternity season to minimize direct impacts to northern long-eared bat.
 - e. Perform any bridge repair, retrofit, maintenance, and/or rehabilitation work outside of the northern long-eared bat active season (April 1 to October 31) in areas where northern long-eared bats are known to roost on bridges or where such use is likely.
 - f. Do not use military smoke and obscurants within forested suitable northern long-eared bat habitat during the pup season (June 1 to July 31) and/or the active season (April 1 to October 31).
 - g. Minimize use of herbicides and pesticides. If necessary, spot treatment is preferred over aerial application.
 - h. Evaluate the use of outdoor lighting during the active season and seek to minimize light pollution by angling lights downward or via other light minimization measures.
 - i. Participate in actions to manage and reduce the impacts of white-nose syndrome on northern long-eared bat. Actions needed to investigate and manage white-nose syndrome are described in a national plan the Service developed in coordination with other state and federal agencies.

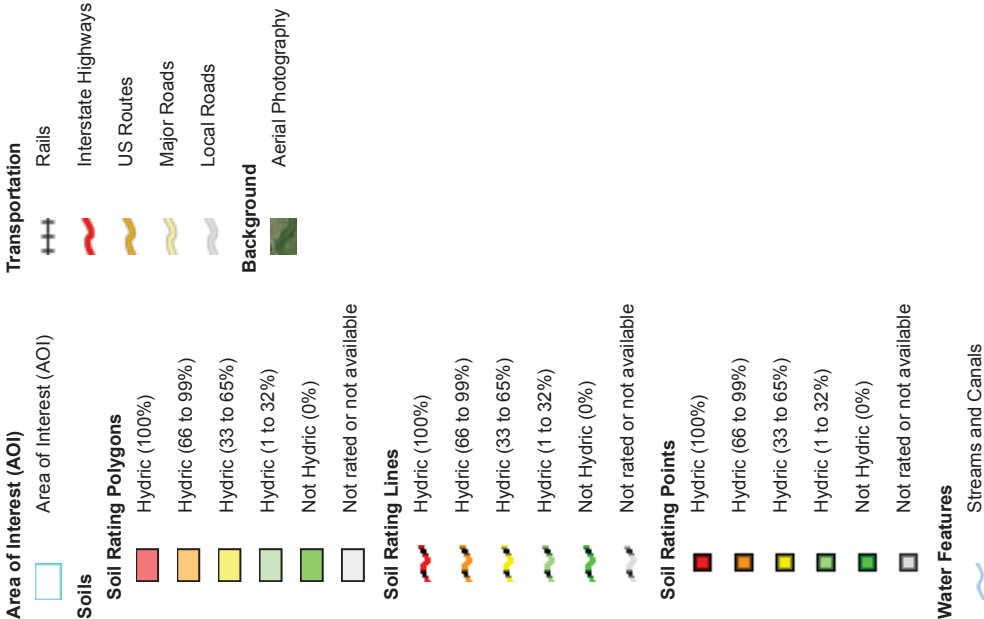


Map Scale: 1:2,140 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

MAP LEGEND



MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Crawford County, Kansas

Survey Area Data: Version 16, Sep 20, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 3, 2010—Nov 19, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydric Rating by Map Unit

Hydric Rating by Map Unit— Summary by Map Unit — Crawford County, Kansas (KS037)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8863	Parsons silt loam, 0 to 1 percent slopes	0	5.5	100.0%
Totals for Area of Interest			5.5	100.0%

Description

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

Rating Options

Aggregation Method: Percent Present

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Section 7.0

List of Preparers

Joshua B. Kramer – *Kramer Consulting, LLC*

Engineer in Training

Joshua aided in the study, design and development of the project, and helped prepare the Preliminary Engineering Report, along with this Environmental Report.

John P. Kramer – *Kramer Consulting, LLC*

Professional Engineer

John produced the Preliminary Engineering Report along with this Environmental report.

Daniel H. Clair – *Kansas Department of Health and Environment*

Professional Engineer

Daniel reviewed the Preliminary Engineering Report for this project, and also provided the Waste Stream Summary Review.

APPENDIX H

WASTE STREAM DISPOSAL REPORT APPROVED BY KDHE
ON JULY 9, 2018



KRAMER CONSULTING, LLC

Engineers • Planners • Surveyors

WASTE STREAM DISPOSAL

WATER TREATMENT PLANT

for

CITY OF FRONTENAC, KANSAS

RECEIVED

JUN 04 2018

BUREAU OF WATER

Job No. 1801

June 4, 2018

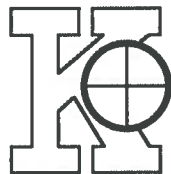
WASTE STREAM DISPOSAL

WATER TREATMENT PLANT

OWNER:

CITY OF FRONTENAC, KANSAS

ENGINEERS:



KRAMER CONSULTING, LLC

2335 S.E. Tecumseh Road

Tecumseh, Kansas 66542

(785) 234-6600



Job No. 1801

June 4, 2018

KRAMER CONSULTING, LLC

ENGINEERS • PLANNERS • SURVEYORS

2335 S.E. TECUMSEH ROAD • TECUMSEH, KANSAS 66542

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June 4, 2018

Waste Stream Disposal - Water Treatment Plant

City of Frontenac, Kansas

The City of Frontenac is proposing water treatment plant improvements and upgrades in order to continue to provide reliable, adequate and safe drinking water for the City patrons. The proposed plant improvements and upgrades will not change the existing waste streams. However, the addition of a Hydrogen Sulfide (H_2S) air scrubber, lime softening solids contact basin, recarbonation basin and belt filter press will produce an additional waste stream as outlined in this report. This is an updated report to a prior submitted report dated May 6, 2016, which was approved on May 16, 2016.

Included as a part of this waste stream summary review is a Process Flow Diagram labeled Figure 1 showing the flow process, along with chemical feeding points, principal chemicals present and characterization for the waste streams generated. Also included is an aerial photo labeled Figure 2 showing the water treatment plant waste stream discharge route through Frontenac's sanitary sewer collection system to the waste stabilization ponds.

The average water treatment plant run time, based on the design year 2038, is 11.5 hours per day at a plant operating rate of 700 gpm. The water treatment flow, as shown in Figure 1, starts from the existing water supply wells, pumped to the water treatment site through aerators, then injected with 12 lbs./day Cl_2 . Once the water goes through the aerators, it flows through the chlorine contact basin which is designed for disinfection and settles out the hydrogen sulfide from the water. The water from the chlorine contact basin flows into the solids contact basin where it is mixed with 975 lbs./day Hydrated Lime $Ca(OH)_2$. From the solids contact basin, the water will flow through a recarbonation basin to lower the pH of the water back to acceptable levels near 8 by feeding 186 lbs/day CO_2 . After the water has been recarbonated, it then flows to the water treatment filters. Water is then chlorinated with a manual chlorine gas feed system at 12 lbs./day while entering the clearwell. From the clearwell, treated water is then pumped to the City's water distribution system. With the addition of the H_2S air scrubber, air discharged from the aerators will go through a duct to the air scrubber. The air will be treated with 6 gallons/hour 25% NaOH and 42 gallons/hour 12.5% NaOCl in the air scrubber to help with hydrogen sulfide odor, then the air is released from the scrubber unit into atmosphere. No process water enters the H_2S air scrubber. The water treatment plant flow process can be seen on Figure 1, attached herein.



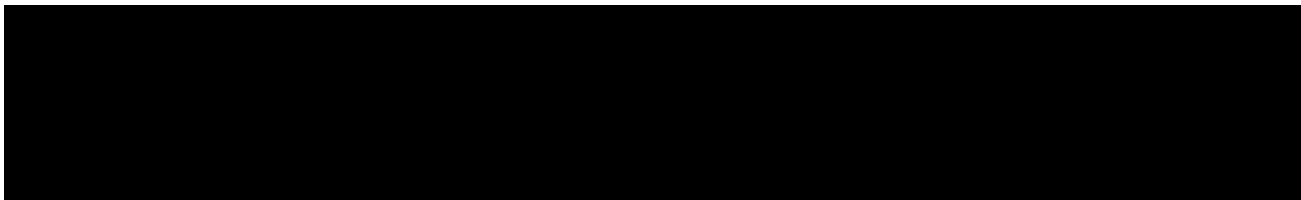
The City tests treated water for chlorine residuals and pH in the laboratory. This is the only testing completed in the laboratory. There are no on-line analyzers. The only process waste stream related floor drain is located in the laboratory and it is primarily used when mopping the floor. There are no other process related floor drains located in the City's Water Treatment Plant. There is one domestic waste related floor drain located in the plant and it drains to the existing sanitary sewer system.

The plant discharges all process water waste streams to a Filter Backwash Waste Sump. Waste water from the Filter Backwash Waste Sump is then pumped out to a manhole located in the City's existing sanitary sewer collection system, then the waste water gravity flows from that manhole to the City's existing First Cow Creek Pump Station and then is re-pumped at the First Cow Creek Pump Station to the waste stabilization ponds (lagoons) for treatment.

The domestic waste stream gravity flows from the water treatment plant, north to the existing sanitary sewer along McKay street, and then flows through the gravity sewer collection system disposal path that the process water waste stream flows through.

The process water waste stream and the domestic water waste stream are not directly connected.

The process water waste stream, along with the domestic waste stream disposal path to the City's waste stabilization pond treatment system can be seen in Figure 2, attached herein.



The City's waste stabilization pond treatment system operates under a National Pollutant Discharge Elimination System (NPDES) Permit No. M-NE27-OO01, which allows the City to discharge from the waste stabilization ponds to Cow Creek via First Cow Creek, and eventually flows to the Neosho River Basin. The facility location is in the NE ¼, NW ¼, Section 7, Township 30 South, Range 25 East, Crawford County, Kansas.

The existing sanitary sewer collection system, Filter Backwash Waste Sump pumps and the First Cow Creek Pump Station pumps are adequately sized to handle existing waste streams and additional waste stream of 2,070 gallons per day from H₂S scrubber, as well as an approximated 790 gallons per day liquid from the solids contact basin blow down to the belt filter press operation. The additional 2,860 gallons per day requires the First Cow Creek Pump Station to pump an additional 2 minutes per day.

The two current water supply wells have exceeded the Maximum Contaminant Level (MCL) for Combined Radium (-226 and -228) of 5 picocuries per liter (pCi/L) in Running Annual Average (RAA) tests. The first exceedance was from a sample collected on August 7, 2017, at a level of 6.6 pCi/L, the second exceedance was from a sample collected on November 13, 2017, at a level of 5.1 pCi/L, and the third exceedance was from a sample collected on February 13, 2018, at a level of 4.7 pCi/L, which brings the Combined Radium (-226 and -228) RAA to 6 pCi/L.



Table 1 below shows typical chemical well water analysis for Frontenac's wells:

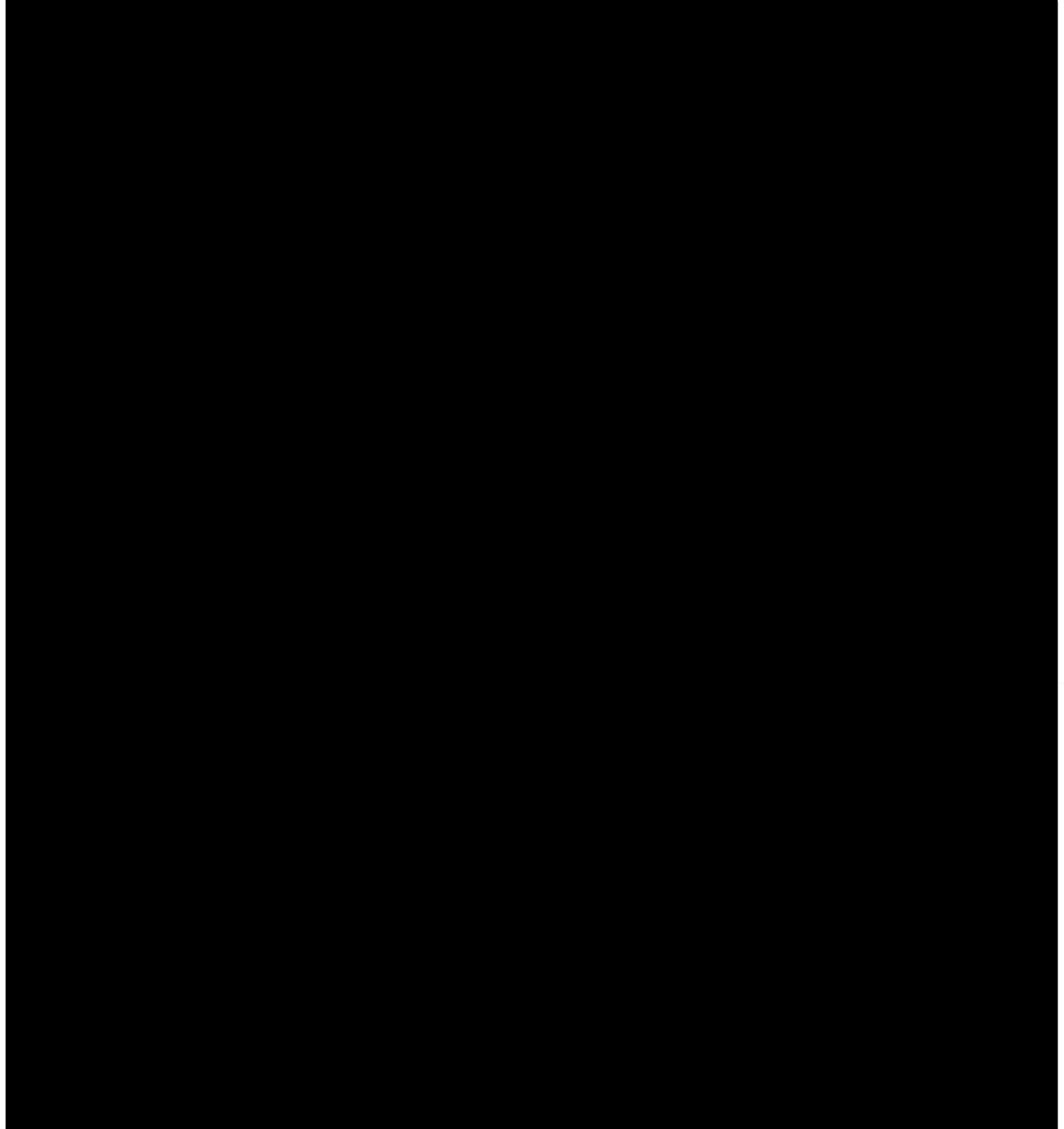
TABLE 1 <i>Well Water Supply Water Quality</i>		
Component	Well Water Supply	Units
Total Hardness, as CaCO ₃	240	mg/L
Calcium, as Ca	55	mg/L
Magnesium, as Mg	25	mg/L
Sodium	100	mg/L
Total Alkalinity, as CaCO ₃	200	mg/L
pH	7.8	pH s.u.
Specific Conductivity	1,060	umho/cm
Chloride	187	mg/L
Sulfate	35	mg/L
Nitrate, as NO ₃	0	mg/L
Fluoride	1	mg/L
Iron	0	mg/L
Manganese	0.002	mg/L
Total Dissolved Solids	551	mg/L
Arsenic	0.0002	mg/L
Barium	0.4	mg/L
Selenium	0	mg/L
Silica	11.2	mg/L
Aluminum	1	ug/L
Potassium	5	mg/L
Zinc	0.008	mg/L
Corrosivity	0.274	LANG
Gross Alpha	9	pCi/L
Radium 226	3	pCi/L
Radium 228	<1.0	pCi/L
Hydrogen Sulfide Gas	4.0-11.0	ppmv
Total Trihalomethanes (TTHM)	0.0027	mg/L
Haloacetic Acids (HAA5)	0.004	mg/L

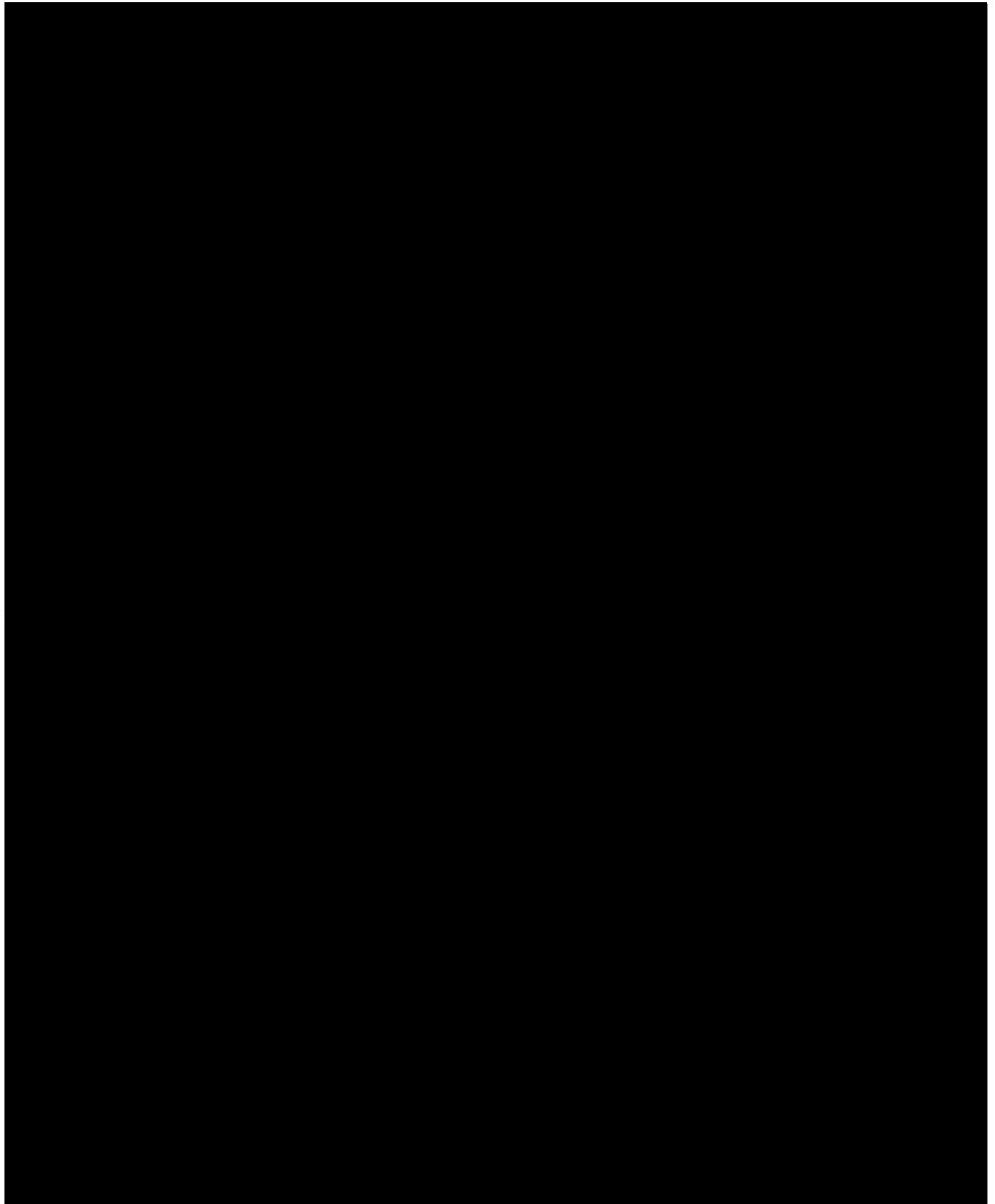


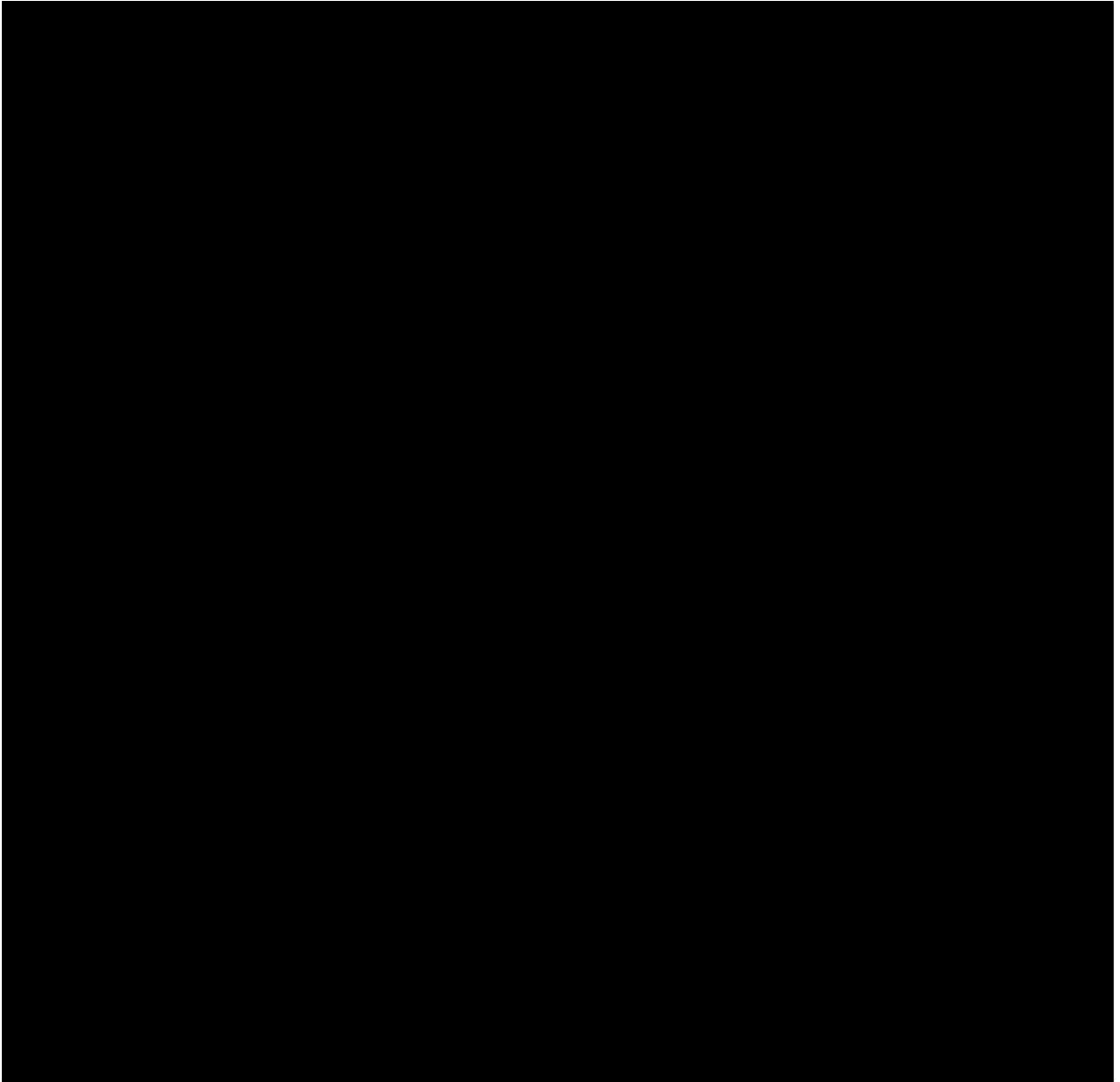
The following portion of the report explains waste streams produced from the existing water treatment plant and the addition of the H₂S air scrubber unit, lime softening solids contact basin, recarbonation basin and belt filter press.

A. Existing Water Treatment Plant

Waste streams from the existing water treatment plant before the addition of the proposed H₂S Air Scrubber unit and Softening Process are as follows:





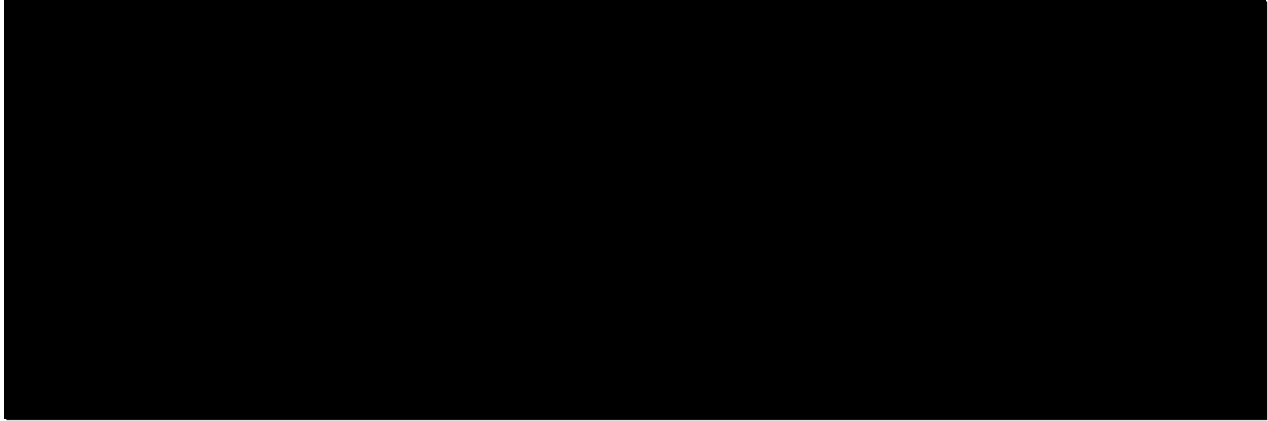


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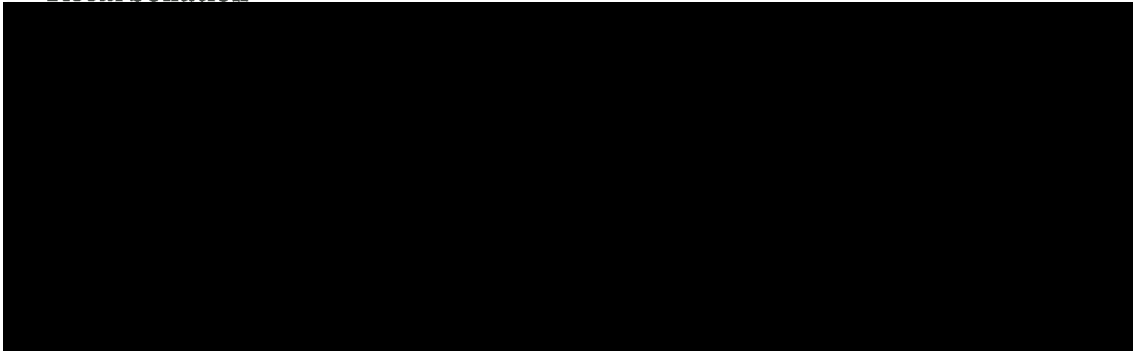


C. Summary of Waste Streams

All waste streams after plant improvements are completed will be discharged and flow through the City's existing sanitary sewer collection system to the waste stabilization ponds for treatment,



Water Plant with addition of Hydrogen Sulfide (H₂S) Removal, Lime Softening and Recarbonation



Memorandum of design will be submitted prior to the final development of Plans and Specifications for water system improvements for KDHE review and approval.

Respectfully Submitted,
KRAMER CONSULTING, LLC

A handwritten signature in blue ink, appearing to read 'Josh B. Kramer'.

Josh B. Kramer, P.E.
Project Engineer



